



Telegraphic Address: "TRAZETTE PARL., LONDON" "Telephone No.: WHITEHALL 9233 (6 lines)

Annual subscription payable in advance and postage free:
British Isles and Abroad £2 5s. 0d.
Single Copies One Shilling

Registered at the General Post Office, London, as a Newspaper

VOL. 73 NO. 2

FRIDAY, JULY 12, 1940

CONTENTS

	PAGE
Editorials	29
Letters to the Editor	32
The Scrap Heap	33
Overseas Railway Affairs	34
Centenary of Railway Inspection	35
The Improvement of the Steel Rail	39
Electric Traction Section	41
London Transport Steam Locomotives	46
Transport Services and the War	49

INDEX

An index to the 72nd volume of THE RAILWAY GAZETTE covering the issues from January 5 to June 28, 1940, is now available. Normally THE RAILWAY GAZETTE index is distributed to every reader, but on this occasion, in view of the shortage of paper, it is proposed to supply copies of the index (post free) only to readers who apply for it. Applications should be made to the Publisher

NOTICE TO SUBSCRIBERS

Consequent on further paper rationing, new subscribers cannot be accepted until further notice. Any applications will be put on a waiting list which will be dealt with in rotation in replacement of existing subscribers who do not renew their subscriptions.

Annual subscriptions are payable in advance and subscribers are advised to pay their renewal accounts before the expiration of the existing subscription as the dispatch of copies will in all cases be stopped on expiration

DISPATCH OF "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE possesses the necessary permit and machinery for such dispatch, and any reader desirous of arranging for copies to be delivered to an agent or correspondent overseas should place the order with us together with the necessary delivery instructions.

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas, as they are stopped under the provisions of Statutory Rules & Orders, 1940, No. 629

Individual Initiative and Responsibility

FTER the tremendous events of the last few months on the Continent, a new phase of the war is upon us. Since war began last September it has provided a series of unexpected happenings, many of them successes for the enemy, but some of them for us. The "miracle" of Dunkirk probably provided the enemy with his biggest surprise and shock, for it was a demonstration of the power inherent in that little something he hasn't got. It gave a supreme opportunity to individual initiative and responsibility; and, after all, it is to provide continuous scope for these great human qualities inherent, more or less, in every man, that we are fighting. England is the home of individual freedom—freedom for men to display initiative and to shoulder responsibility. Dunkirk proved that. Only practical faith in the individual can assure our rise from the deadly peril which besets us and our triumph over the powers of darkness and slavery which loom on the horizon. If every decision of authority is henceforward based on an understanding of the "miracle" of Dunkirk, our fight will be shortened and our victory assured.

* * * *

Costa Rica Railway Affairs

The Costa Rica Railway Co. Ltd. owns 188 miles of 3 ft. 6 in. line which, since 1905, have been worked by the Northern Railway Company of Costa Rica as part of the total of 322 miles operated by the latter undertaking. The rolling stock of the Northern Railway consists of 37 locomotives, 49 cars, and 563 freight cars, and includes 22 locomotives, 33 cars, and 350 freight cars, of the Costa Rica Railway. The Costa Rica Company dates back to 1886 and has a concession which will expire at the beginning of 1990 when the railway, rolling stock, and appurtenances will revert to the Government of Costa Rica without payment. The agreement with the Northern Railway is dated June 15, 1905, and provides for the working of the Costa Rica line for the remainder of the concession less the last two months. The Northern Railway takes all receipts, pays all working expenses, and pays to the Costa Rica Company £137,100 a year, subject to adjustment on certain charges being made in the debenture debt. So far, although there have been suggestions made by the Northern Railway that the rental should be reduced—and the Costa Rica directors had expressed willingness to consider a more flexible form of agreement—the arrangement had proved acceptable to both parties.

* * * *

Refusal to Remit

An extraordinary state of affairs has now arisen and was explained to stockholders of the Costa Rica Railway Co. Ltd. by the Chairman, Mr. H. C. Drayton, at a meeting held in London on July 3. He explained that the Northern Railway was a wholly owned subsidiary of the United Fruit Company, an American concern, and that its operations were interwoven with those of that undertaking. In response to the Costa Rica Company's usual letter of reminder that £21,000 was due on June 17 and that £44,000 was due at the end of that month a reply was received to the effect that owing to the decline in traffic on the railroad it would be impossible for the Northern Company to meet the payments. That reply was not received in London until June 19, two days after the payment was due. The Costa Rica directors have already consulted an American lawyer as to the steps which should be taken. Their legal remedy is to take back their own line and work it for themselves, and at the same time under the agreement they acquire, by the default, the voting rights of the whole of the ordinary shares of the Northern Railway Company. The steps which will be taken have yet to be decided and they are necessarily complicated by the exigencies of the times. Happily there is every indication that the matter is in the hands of determined and resolute directors who will take whatever

action may be necessary to protect the rights of their stockholders.

* * * *

Overseas Railway Traffics

Aggregate traffic returns of the Argentine railways as shown in the accompanying table bring the figures for the financial year up to June 29, 1940, but compare with a period which ended on July 1, 1939. Similar conditions apply to the returns of the Central Uruguay which show an increase in the aggregate of £157,736, and of \$248,777 in currency. With regard to Brazilian railways, the Great Western and the Leopoldina show respective increases in sterling of £48,900 and £77,352, and the San Paulo for the 26 weeks to June 30, 1940, shows an improvement of £126,501.

	No. of Weeks	Weekly Traffics	Inc. or Decrease	Aggregate Traffic	Inc. or Decrease	
Buenos Ayres & Pacific*	52nd†	1,124	—	71,223	—	
Buenos Ayres Great Southern*	52nd†	1,784	—	119,875	—	
Buenos Ayres Western*	52nd†	777	+	176	40,684	+
Central Argentine*	52nd†	1,420	—	573	90,501	—
Canadian Pacific	26th	945,800	+ 302,800	15,077,000	+ 2,715,400	
Bombay, Baroda & Central, India	13th	212,100	+ 33,075	2,610,900	+ 263,250	

* Traffic returns in thousands of pesos. † 52 weeks and 1 day in 1938-39.

Canadian Pacific gross earnings for the first five months of 1940 amounted to £12,238,600, an increase of £1,947,800 in comparison with the corresponding period of 1939, and the aggregate net earnings of £1,942,600 showed an improvement of £1,085,000.

* * * *

Finance of Transport

Days when the major endeavour in the raising and disbursement of large sums of money was to secure construction and improvement are recalled by the issue of the accounts of the London Electric Transport Finance Corporation Limited and of the Railway Finance Corporation Limited. These undertakings were both registered in 1935 and their purpose was to enable the main-line railways and the London Passenger Transport Board to put in hand large-scale development works and so help to absorb some of the mass of unemployed, then one of the chief problems facing the Government. The companies have share capitals of but £100 apiece, but the debenture issues are guaranteed by the Treasury and amount to £41,650,000 in the case of the L.E.T.F.C. and to £27,000,000 in the case of the R.F.C. There is no doubt that the railways and the board have benefited and will benefit from the works which have been put in hand with money raised more cheaply than could have been done without Exchequer backing. It was intended that by now these works would have been nearing completion, but first the threat of war, and then its actuality, with the respective concomitants of rising prices for materials and of scarcity of supplies, have deferred that happy day. Some of the projects, such as the rebuilding of Euston station, have not even been started. Others have been held in abeyance, as, for instance, the extensions of the Central London Line, as we recorded in THE RAILWAY GAZETTE last week.

* * * *

Northern Ireland Railways in 1939

Results for 1939 of railways wholly or partly in Northern Ireland, as shown by the Ministry of Commerce figures, were generally better than those for 1938 and 1937. On railways wholly in Northern Ireland—the Belfast & County Down, Bessbrook & Newry, Carrickfergus Harbour Junction, Clogher Valley, and Northern Counties (L.M.S.R.)—the total net income was £48,907, against £11,642 in 1938 and £18,599 in 1937. Railway working of these companies gave net receipts altogether of £5,145, contrasting with losses of £31,179 in 1938 and of £17,156 in 1937. Passenger train receipts amounted to £383,948, compared with £361,775 in 1938 and £367,299 in 1937, and total goods train receipts were £189,021, against £163,493 in 1938 and £182,788 in 1937. Railways partly in Northern Ireland include the County Donegal; Dundalk, Newry & Greenore; Great Northern; Londonderry & Lough Swilly; Sligo, Leitrim & Northern Counties; and Strabane & Letterkenny. They secured a total net income in 1939 of

£142,455, compared with £67,764 in 1938 and £136,805 in 1937. From railway working the total net receipts in 1939 were £88,818, against £14,000 in 1938 and £83,392 in 1937. On the Great Northern the profit on railway working was £104,406 and on the County Donegal it was £12,566, but the other railways showed losses. Road transport profits in Eire on the Great Northern were £10,982 and on the Londonderry & Lough Swilly they were £4,346.

* * * *

London Transport Steam Locomotives

Before November 1, 1937, the London Passenger Transport Board operated steam locomotives for the haulage of Metropolitan Line passenger trains, mainly over the non-electrified portion of the Metropolitan & Great Central Joint Line beyond Rickmansworth, and for goods working on the Metropolitan Line and on the Met. & G.C. and the Watford Joint Lines. The reconstruction of the Neasden rolling stock depot in connection with the Metropolitan Line improvements included in the £45,000,000 New Works Programme, made it impracticable to provide sufficient accommodation at this depot for examining and maintaining so many steam locomotives as are required for these purposes, and the L.N.E.R. therefore agreed to buy certain of the London Transport steam locomotives, goods wagons, and brake vans, and to provide on agreed terms the whole of the steam locomotive power required for public services on both the Metropolitan Line and the Joint Lines. On November 1, 1937, the L.N.E.R. therefore took over 18 of the London Transport steam locomotives, 252 goods wagons, and 13 brake vans. The board's steam stud now comprises 14 units, retained in service for working permanent way trains and for special purposes; these form the subject of a short article on page 46.

* * * *

East Gothland Narrow-Gauge Railways

The East Gothland (Östergötland) narrow-gauge railways, in Sweden, are worked by a managing organisation that covers the four lines known as the Central East Gothland (Mellersta Östergötland), Northern (Norra Östergötland), Norrköping—Söderköping—Vikboland, and Väderstad—Skänninge—Bränninge Railways. The annual reports show that all except the last-named made a working profit in 1939, with increase on the previous year. The V.S.B.R., however, incurred a loss, and here again the figure was higher than for the 1938 deficit; although receipts increased, permanent way and rolling stock expenses did so disproportionately. There has been a considerable diminution in road motor traffic since the war began, presumably due to the difficulty in obtaining fuel and other supplies, and this has brought an increase of passenger and goods traffic to the local railways. The paper industry has also experienced an improvement and this has helped to some extent. Gravel deposits are being worked successfully. All lines have acquired additional railcars and are using them in preference to the old type of train.

* * * *

Increased Charges on Canals

At various dates the Minister of Transport has in recent months exercised his powers to increase charges on the canals. These advances have been made by Statutory Rules & Orders under the Emergency Powers (Defence) Regulations of last year, and the object has been to make good at least to some extent increases in working costs arising from the war. For that reason every application for an advance in charges has been considered on its own merits and the Ministry has sanctioned a percentage increase based on the investigation made, and varying with the enhanced level of working costs disclosed. Two of the most recent Orders made by the Minister are dated June 15 and relate to the Aire & Calder Navigation and to the Calder & Hebble Navigation. Both of these authorise an increase in charges of 10 per cent. Other waterways which have succeeded in their applications to the Minister include the Sheffield & South Yorkshire, the Trent Navigation & Nottingham, the Lee & Stort, and the Grand Union. The amounts by which

these undertakings have raised their charges vary between 10 and 50 per cent., but in every case the criterion has been the same, the expansion of wartime costs.

* * * *

Acceleration by Retardation

Particularly in suburban service, efforts have been made for many years to increase the rate of acceleration as a means to cutting the schedule and giving a high start-to-stop speed over comparatively short distances, but nothing like the same attention appears to have been paid to a higher rate of deceleration as a factor acting towards the same object. Locomotives have been braked up to 80-100 per cent. of the unladen weight on the wheels and carriages up to 100 per cent., but the general method of making stops showed that nothing like these forces were used, and the steam suburban train was very much inferior to the electric multiple-unit type with electrically-controlled air brakes giving maximum retarding force as well as minimum delay in application. The deceleration controllers now regarded as standard equipment for really high-speed trains may yet come to be a regular fitting on steam suburban locomotives and trains, and instead of having continuous or stepped control from a force of 250 to 300 per cent. at 90-100 m.p.h. will probably have 150 to 160 per cent. at 40 m.p.h. and 100 per cent. at 20 m.p.h.

* * * *

Locomotive Maintenance in Wartime

The condition and repair of locomotives naturally represents a more difficult problem in wartime than when circumstances are normal, and must of necessity be one of outstanding complexity in invaded countries. The chaos there affects the railways if anything more adversely than other branches of activity, for in almost every conceivable circumstance transport provides the life blood of a nation. Until a reasonable standard of circulation can be secured, disruption and stagnation must remain as an inevitable consequence. Locomotive maintenance is usually effected in accordance with systematic rules governing the scheduling of the engines for classified repairs, purchasing and storing of the materials needed, and the processing of them throughout the machining and other operations. In the circumstances referred to, all such systems must break down at least temporarily, and, although this may be offset by the fact that the railway itself having become disorganised and the services reduced the locomotives are not of such immediate value, the time must come when the question of repairs arises in full force. This was one of the most difficult post-war problems in Germany for some years after 1919, when only a relatively moderate percentage of the locomotives could be maintained in service. Added to this was the fact that large numbers of engines had to be transferred elsewhere on reparation account, and these represented a total loss to the German railway system.

* * * * *

The Holiday Spirit

Mural decoration in canteens for the Forces shows much variety, amid which the use of railway posters seems as good an idea as any. Here those responsible for enlivening bare walls, and the leisure moments of the men who live within them, have a source to draw on of acknowledged artistic merit, treating a subject especially close to the hearts of a citizen army. Men in uniform do not expect summer holidays, but that is no reason why they should not in imagination identify themselves with the sun-tanned silhouettes who saunter endlessly on pier and promenade in the compositions of our railway poster artists. Keats, in his "Ode to a Grecian Urn," wrote of the undying fascination of human figures arrested by the artist in the course of everyday pursuits. We do not presume to compare modern commercial art with the art of Ancient Greece. Instead, we feel that in the suspended activity of these painted poster figures we find a parallel with our own wartime condition, and the urge so to conduct ourselves that once again such scenes may come to life.

Railway Safety Legislation Centenary

EXACTLY a century ago, and ten years after the opening of the Liverpool & Manchester Railway, where Stephenson's *Rocket* had set the seal of future success on the new system of long-distance transport, soon to spread with remarkable rapidity throughout the land, the State found it advisable in the public interest, on the representations of a Select Committee of the House of Commons, to exercise through the Board of Trade some measure of supervision over railway working. In 1840 therefore an Act of Parliament authorised the appointment of Inspecting Officers of Railways, who have since then been drawn from the Corps of Royal Engineers in unbroken succession down to the present day, as given in an article on page 35. Their duties were to examine new railways and to report on construction and equipment, while the companies were required to notify all accidents involving personal injury. A curious feature of the Act was that it empowered any officer or agent of any company, or any special constable or person called by him to his aid, to seize any railway servant found to be drunk or doing anything to imperil the safety of working. Two years later a further Act remedied some defects of the earlier one and enabled the Board of Trade to postpone the opening of a line if its condition was considered unsatisfactory.

Even at this early period of railway history, however, the relatively high safety of travelling by train was realised, for the committee of 1839 said that "considering the great numbers of persons who have travelled over railroads, it may be confidently stated that very few accidents have occurred and that it did not appear that the velocity of the conveyance was necessarily attended with that degree of risk which many persons, unacquainted with the new method of travelling, had anticipated." In the eleven years, 1840 to 1850 inclusive, 81 persons lost their lives in train accidents, properly so called, which fully bore out this opinion; the highest number of fatalities in any one case was 8, in the derailment in Sonning Cutting, Great Western Railway, on December 24, 1841. In 1842 there was only one accident fatal to passengers—with but one death—and 1849 showed a similar result, with five deaths. The first accident involving more than twenty fatalities did not occur until the Clayton tunnel disaster on the Brighton line in 1861, when 23 passengers lost their lives; this case attracted a great deal of attention.

Large numbers of persons were injured in early years, however, through such causes as slipping when getting in and out of trains, owing to want of proper footboards, or were run down when crossing lines at stations where there were no footbridges, and in similar ways, so that an impression that railway travelling was dangerous remained in the public mind. There were also many minor derailments and failures of equipment, while unpunctuality was a great and constant source of dissatisfaction. In spite of this, and the considerable criticism of railway administration evoked in Parliament, no safety legislation of consequence occurred until passenger communication was enforced in 1868; but in 1871 the powers of the Board of Trade were enlarged and made more precise, with beneficial results in due course. In the few years immediately after there were some serious accidents, but, notwithstanding the work of the Royal Commission of 1874, nothing further was done until the Armagh accident in 1889, when the block system, interlocking, and automatic continuous brakes became obligatory. From then onwards further enactments really served to strengthen and consolidate previous efforts, although the Railway Employment Act of 1900, as it affected accidents to servants, enlarged the

scope of the law and brought, none too soon, a wider spirit of social justice to bear on the whole problem.

The great feature of British legislation on this subject has been its attempt to secure effective results with the least possible interference in technical matters, and in this it has been remarkably successful on the whole, contrasting greatly with the very elaborate methods adopted in some other countries, where even the details of design of railway equipment are dealt with by State authority. The very high degree of safety which the passenger has long enjoyed on British railways has thus been achieved with the minimum of Government interference, with the result that a wide field has been left to individual resource and ingenuity in perfecting many types of signalling and other safety devices and in testing their relative merits in service on an extended scale. At the same time, the relations between the officers appointed by law to enforce legislation and those responsible for practical railway working—on whom the final responsibility towards the public has always been left to rest—have been good and, certainly in later years, marked by very great mutual confidence, although in former days there were occasions when some railway managements received strong and not undeserved criticism. The publicity given to all official accident inquiries and reports has had a beneficial effect on the course of events. The results being what they are, it is unlikely that Great Britain will depart from a path that has so justified itself or that more than minor legislative steps are likely to follow, as experience shows one little improvement or another to be practicable and desirable.

This does not mean that there are no problems calling for attention—the question of occupation crossings and the position created by the growth of motor traffic is a case in point, as is illustrated by the report on the accident at Hilgay—but that they can be, as they are being, examined under existing powers with the care and attention they require, and will certainly be made the subject of such improvement as proves feasible, having regard to all the interests involved. The railway traveller has no reason to be dissatisfied with the steps taken generally to ensure that he reaches his destination safe and sound. No industrial legislation, however, can be of much effect unless accompanied by the conscientious performance of duty by those entrusted with the actual working of the machine concerned, and the railway servant—using the term in its widest sense—has his own particular and vital part to play in safeguarding equally his own life and the lives confided to his charge. Any deterioration in this

respect would give the passenger just cause for misgiving. With the extension of rail transport to street tramways, the jurisdiction of the Board of Trade became extended to them, and particularly as steam, cable, and electric power were successively introduced thereon. In line of succession, trolleybus services have become a subject for inspection by the Ministry of Transport, to which on its creation the railway and tramway activities of the Board of Trade were transferred, while the Inspecting Officers of Railways are responsible to the Minister for all technical advice on general matters relating to these systems of transport and all committee work associated therewith. It may fairly be claimed that the cumulative effect of the activities over the past 100 years of the Inspecting Officers has been beneficial to the travelling public and employees concerned, and has contributed to the increased efficiency and safety of railway, tramway, and trolleybus operation. A brief reference is added at the end of our article on page 39 to the extended wartime administrative and technical duties of the inspectorate.

* * * *

Corrosion in Locomotive Boilers

A REPORT presented at a convention of the American Railway Engineering Association held recently dealt with intercrystalline corrosion or embrittlement of locomotive boilers. Unlike rusting and pitting, embrittlement, it was stated, seems to occur only when the metal is under stress, particularly that brought about by tension. Stresses in locomotive boilers are produced by the structural load, the steam pressure and the cold working of the metal, and laboratory investigations indicate that the latter source of stresses is of the greatest importance. The cold bending of a plate to form a locomotive boiler section will at times introduce enough stress to make embrittlement possible, whilst the cold distortion of the metal during the riveting of a seam may be even more productive of stress. To prevent embrittlement, excessive pressure and structural stresses in the seam should be avoided, and all possible care should be exercised to the end that such stresses do not become localised, for a fracture may be started from one point which will be difficult to stop. Above all else, however, the cold working of the plate, butt strap, and rivet metal should be reduced to a minimum and, as the report adds, it is believed that the careful design and fabrication of locomotive boilers can prevent a large proportion of fractures even where the water conditions are bad.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

A Railway-minded Authoress of 1807

Essex House, W.C.2

July 6

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—For a woman living in the first decade of the 19th Century Miss E. I. Spence (the authoress cited in my article "The First Railway Journey in Literature," published in your July 5 issue) was extraordinarily railway-minded. In her "Summer Excursions" she records, in addition to her journey on the Oystermouth Railway, a visit she paid in September, 1807, to an inclined plane at Chapel-en-le-Frith, presumably that at "Chapel Townend" of "six hundred yards long using 4 inches per yard" (Priestley) on the Peak Forest Railway made under the Peak Forest Canal Acts of 1794, 1800, and 1805. In Letter XV, contained in the first volume of the "Summer Excursions" (1809) dated Chapel-en-le-Frith, September 27, 1807, Miss Spence wrote:—

"We have just returned from seeing a curious specimen of art, called an inclined plane, for conveying limestone from the

top of a steep hill down to the valley beneath, in small iron waggons without horses, conveying 2 tons each, which run on an iron rail-way, and are set in motion by a machine from the top of the hill; and seven loaded waggons descend while seven empty ascend. This ingenious piece of mechanism is not less amusing than interesting."

Yours faithfully,

KENNETH BROWN

REVISED B.S.S. FOR COPPER ALLOY BARS.—Revised specifications have just been issued for the following:—

- B.S. 218. Brass bars and sections, suitable for forgings and drop forgings.
- B.S. 249. Brass bars (high-speed screwing and turning).
- B.S. 250. High-tensile brass bars and sections.
- B.S. 251. Naval brass (Admiralty mixture) bars and sections.
- B.S. 252. Naval brass (special mixture) bars and sections.
- B.S. 369. Phosphor-bronze bars or rods for general purposes.

Copies may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 2s. 3d. each post free, or 12s. 6d. for the set of 6 publications.

PUBLICATIONS RECEIVED

The Modern Railway. By Julius H. Parmelee. London : Longmans, Green & Co. Ltd., 39, Paternoster Row, E.C.4. 8½ in. x 5½ in. 730 pp. Price 25s. including extra war costs.—Few American names are better known in British railway circles than that of Dr. Julius H. Parmelee who, since 1920, has been Director of the Bureau of Railway Economics of the Association of American Railroads. The present volume from his pen aims at describing and explaining rail transport in the U.S.A., what these railways are, what functions they undertake, and how they work. Popular interest in railways in America has taken peculiar forms, not entirely like those in any other part of the world. For many years the political and financial aspects were paramount and it is only within very recent years that a popular interest in the equipment for railway transport has resulted in the growth of a railway enthusiast move-

ment of considerable size. The latter movement has developed its own literature and within the last four or five years many popular works, some of them of considerable merit, have been produced in the States.

Dr. Parmelee has set out to serve an entirely different class of reader, namely, the serious student of "every important feature of the institution which we call the railroad." Accordingly, this work is no text book on a particular feature of the modern railway, either operating or engineering, but is a general survey giving a clear, comprehensive, and accurate introduction to the whole subject. Every chapter finishes with a well-chosen list of references to works dealing with some particular branch of railroading in greater detail than the space at Dr. Parmelee's disposal will permit; in addition, the book is very well indexed. There can be little doubt that "The Modern Railway" is a text book

which will be of considerable value to students of American transport, and we welcome its appearance.

Compressors.—The great variety of compressors and equipment available for railway and general engineering purposes is well shown in the latest 40-page catalogue issued by B.E.N. Patents Limited, of High Wycombe. In addition to the more normal machinery for pressure air installations, the catalogue covers spray-painting devices, includes useful compressed air tables and data, and describes the leading features of B.E.N. products.

Electric Furnaces.—Birlec electric furnaces of comparatively small size but intended for heavy service are fully illustrated and described in the latest brochure (No. 54) issued by Birmingham Electric Furnaces Limited, of Erdington, Birmingham 24. One of the principal features of this type of furnace is the use of resistors made of high-quality nickel-chrome strip bent into sinuous form and mounted on patent nickel-chrome hook supports.

THE SCRAP HEAP

GENTEEL LODGING

Dining-room and Bedroom, 65, Eglington Street, commanding a fine view of the Paisley Railway as it approaches Tradeston.—*From 100 Years Ago in "The Glasgow Herald" of July 2.*

* * *

The oldest locomotive in service on the South African Railways is engine No. 0416, Class "01," a 2-6-0 saddle tank built by Kitson & Co., and placed in service in 1877, and still working in the harbour area at East London. A picture and brief particulars are given in the June issue of the *South African Railways & Harbours Magazine*.

* * *

The oldest newspaper is published in Pieping, China. It is called the *Pching-Pao* and has been in existence for over a thousand years. Over 800 editors of this paper have been beheaded for printing articles not pleasant to the authorities.—*From "The Mutual Magazine."*

* * *

The July issue of *The P.D. Review* (issued by the Powell Duffryn Associated Collieries Limited) contains some items from a cash book dated 1811 kept by John Morgan, the shipping agent at Cardiff of Walter Coffin, one of the earliest pioneers of the South Wales coalfield. Walter Coffin, the son of a tanner in Bridgend, built three miles of tramway connecting Dinas with Dr. Griffiths's tramway at Gyfeillon, gaining access at Treforest to the Doctor's Canal, which connected lower with the Glamorganshire Canal about half-a-mile north of Upper Boat, and bringing much trade to Pontypridd which had previously gone to Llantrisant. In 1839,

just before the opening of the Taff Vale Railway line, he sent down to Cardiff by canal 56,000 tons from Dinas Colliery. Strangely enough, although he was one of the chief supporters of the Taff Vale Railway line construction in 1836, he was opposed to taking the lines up the Rhondda as he saw no profit in it. He became Chairman of the company in 1855. Mr. Coffin was M.P. for Cardiff, 1852-57, and died at Llandaff Court in 1867.

* * *

Railway construction in China in the early days was hedged round with all kinds of curious restrictions. In connection with the survey for a railway from Kirin, a correspondent informs us that it was proposed to make a junction on this line for Mukden at a place called Lanpien, a short distance outside the city. The Chinese General of Mukden, however, was much perturbed, and got a number of geomancers to investigate the effect of this selection upon Mukden. These sages reported that the vertebrae of the dragon which encircles the holy city of Mukden would be broken by driving the long nails of the railway sleepers into them, and accordingly the Tartar general vetoed the decision of the engineers, and directed them to take another route from Kirin to Newchwang without approaching Mukden at all. The engineers reported the matter to Li Hung Chang, who commended the Tartar general for his anxiety for the geomantic influences of the ancestral home of the reigning dynasty, but added that he thought these influences would be improved by the junction rather than otherwise. However, the Viceroy said, as the general had vetoed the decision of the engineers, the matter must be laid before the Emperor. This

alarmed the general, who promptly wrote asking that the works should go on. A place, therefore, was chosen a few hundred yards from the original site, and the geomancers declared that this would not affect the dragon's pulse.

* * *

Colonel George H. Emerson, Chief of Motive Power & Equipment, Baltimore & Ohio Railroad, was head of the engineering section of the Russian Railway Service Corps which went to Russia in 1918, at the instance of the Allies, to help rehabilitate the Russian railways. He recently told the story of the first train that was despatched from Vladivostok to take materials from that port westward. Contrary to Russian railway practice, the train had been equipped with air brakes, and it got away all right; but shortly afterwards the air pressure began to fail, and before the train was more than a few hundred miles west, examination disclosed that all the rubber brake pipes had been taken off the train at stops along the route. Rubber here was much too useful as soles for shoes for the Russian peasants to permit it to get by on the train!

* * *

Fifty years ago, when the Baltimore & Ohio Railroad projected a steeply-graded tunnel under the heart of Baltimore between Camden station and North Baltimore, electric traction was decided upon. The company was the first U.S.A. railway to use electric locomotives, and the first train was hauled through the tunnel on June 27, 1895.

* * *

RAILWAY WORKER TO BROADCAST

In the B.B.C. Broadcast series "My Day's Work" on July 13 at 6.45 p.m. one of the contributors will be R. J. Blackmore, a railway worker from Swindon.

July 12, 1940

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

SOUTH AFRICA

Table Bay Harbour Works

Good progress is being made with the extension of the harbour works at Table Bay. The eastern mole is now complete. It is some 7,000 ft. in length, 4,500 ft. of it consisting of two rows of steel sheet piling tied together and the space between them filled with sand. The remaining 3,000 ft. is built in concrete and serves both as a mole and as an intake for circulating water for the Salt River power station. The top of the piling section is road surfaced, and the whole mole is used for berthing whaling or other craft and for bunkering oil-burning ships.

On the city side of the basin, some 7,500,000 cu. yd of material have already been dredged and thrown up to form about 150 acres of reclaimed land. Some 2,000 ft. of the quay wall at the west end of this reclamation has been completed, and the foundations of a further 300 ft. have been laid. Erection of cargo sheds along this quay is in hand. The old granite block mole which runs across the new basin has nearly all been removed, including over 30,000 blocks.

Durban Harbour Works

The principal feature in the new harbour works at Durban is the construction of a large T-shaped jetty 2,000 ft. long and 800 ft. wide. It is to be served by five big cargo sheds ranging up to 600 ft. in length and 138 ft. in width. When complete this new jetty will have berths for seven large ships.

The outer wall of the jetty is being founded upon concrete caissons, 40 ft. in length and the width of the quay. These are being built in the old floating dock and floated to site, where they are sunk by dredging to a depth of 40 ft. Work is proceeding on both sides of the jetty simultaneously, and already some 2,000 ft. of quay wall substructure have been completed. Two 15-ton and 22 4-ton cranes are to be installed on the jetty. Considerable dredging is necessary to provide deep-water berths alongside it.

Further berthing 1,220 ft. in length has also been provided between the toe of the T jetty and the esplanade, the two cargo sheds serving it having just been completed.

Railway Lines Commission

The report of the Railway Lines Revision Commission, whose terms of reference were published in THE RAILWAY GAZETTE of March 11, 1938, has been issued. It states that in order to visualise the position as it presented itself under present-day conditions, it was felt that a review should be made of all requests for the construction of new lines submitted since the last programme of development lines was sanctioned by Parliament in 1925.

After making this review the commission met public bodies throughout the Union, interested in future railway expansion falling within its terms of reference. General investigations of considerable magnitude which took the form of a survey of the railway system as a whole were carried out. The data thus acquired were utilised towards the consideration of a new policy to be formulated in respect of the construction of any further railways. In accordance with the present policy, Parliamentary authority for the construction of new railways has in recent years been obtained only :—

(a) where it is clearly established that road motor services cannot cope with the transport requirements of the area to be served, and where the volume of traffic is likely to make the proposed line an economic proposition ; or

(b) under a guarantee against all losses in working, including interest charges.

The commission has come to the conclusion that, while the existing policy may be sound, it no longer meets present-day transport requirements, and recommends that it be amplified as follows :—

(a) That new railways be constructed and operated at the expense of the railway administration in cases where—

(i) the traffic offering will produce sufficient revenue to cover working expenditure, including interest and depreciation charges ;

(ii) additional facilities are required to ensure efficient and economic traffic operation ;

(b) That new railways intended to serve specific interests, including industrial and mining undertakings, be constructed subject to an unqualified guarantee against all losses in working, including interest and depreciation charges.

(c) That new railways, the purpose of which is to develop agriculture, forestry, irrigation, and other similar interests in areas where the volume of traffic is not likely to make the proposed line an economic proposition, be constructed only on the specific request of the government department concerned and on condition that the Railway Department be guaranteed against all losses in working, including interest and depreciation charges.

(d) That proposals for the :—

(i) linking up of dead-end lines ;

(ii) connecting up of lines terminating in dead-ends with through lines ;

(iii) straightening and improving of existing lines and the

(iv) provision of relieving lines ; be considered not only from the point of view of the additional traffic which will be offered for conveyance as a result of the development likely to follow, but also of the benefits to be derived therefrom by :—

(1) the public generally ;

(2) government departments ; and

(3) the Railway Department ;

always bearing in mind that the financial responsibility of the Railway Department is not increased out of proportion to the interests of the users of the railways.

(e) That requests for the administration to assume ownership of privately-owned lines be considered entirely on their merits.

(f) That the question of widening narrow gauge lines should not be entirely influenced by the ability of the Railway Department to continue operations under the old conditions, but that due regard must also be paid to the traffic offering at present, to future traffic prospects, and to the efficiency of the service from the point of view of the patrons of the administration.

FRENCH NORTH AFRICA

New Moroccan-Algerian Line

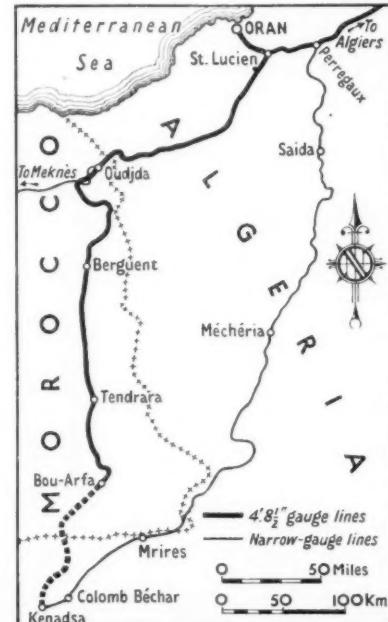
The Moroccan and Algerian Governments have arranged for the construction of a railway to connect Bou Arfa in Morocco, with Kenadsa in the southwest of Algeria. Bou Arfa is the terminus of the Moroccan Eastern Railway, built for the conveyance of minerals, chiefly anthracite, coal, and

manganese. This line is about 175 miles long and the gauge is 1.435 m. (4 ft. 8½ in.). It connects with the Tangiers-Fez line near Oudjda. The anthracite mines are situated near the northern end of the line and the manganese deposits are around Bou Arfa. In the vicinity of Kenadsa are rich deposits of soft coal. The extension of the line for about 80 miles from Bou Arfa southward to Kenadsa will make it possible to convey coal northward to Oudjda and thence to Mediterranean ports. Kenadsa is the terminus of a metre-gauge Algerian line passing through Colomb-Béchar. A grant of funds for building the link between Bou Arfa and Kenadsa was officially announced recently, and it appears that no large expenditure will be required, as no engineering difficulties will be encountered. The line will be laid over stony ground and little ballast will be needed. Even though skirting the hilly region of the Jeb Bechar the gradients will be easy.

Link in Trans-Saharan Route

In connection with the new line, references have been made to plans for the Trans-Saharan Railway. Such plans have been discussed for many years, but nothing definite has been fixed. It is easy to conjecture, however, that the line, if ever it is carried out, might strike south-eastward from Kenadsa or Colomb-Béchar across the Sahara through Reggan and the Tanzeruft area to the Niger river. The line through Bou-Arfa and Kenadsa being free from the danger of sand drifts and built to standard gauge, might in this event prove to be the first section of any Trans-Saharan line.

[This letter from our correspondent in France was written before the recent changes in French policy.—ED., R.G.]



Map showing route of new railway

CENTENARY OF RAILWAY INSPECTION

The first Inspecting Officer of Railways in Great Britain was appointed in 1840 under the Board of Trade; further legislation, notably in 1871, 1889, and 1900, extended the work of the Board's officers, who joined the Ministry of Transport on its formation in 1919

THE first railway fatality to attract considerable public attention, although not a train accident in the ordinary sense, occurred at the opening of the Liverpool & Manchester Railway on September 15, 1830, when William Huskisson, a prominent financial expert and public man—he had been, among other things, President of the Board of Trade and Secretary for the Colonies—was run down by a locomotive at Parkside station and fatally injured. It was soon seen that the new method of transport, which showed every sign of spreading very rapidly throughout the country, had its own peculiar dangers, although much exaggerated by many members of the public, and that some State control over the working of railways was essential in the general interest, both from the safety and other points of view. A Select Committee on railway communication was appointed in April, 1839, on the recommendations of which the Regulation of Railways Act of 1840 was passed; this authorised the Board of Trade to call for returns of traffic, as well as of all accidents attended with personal injury, and sanctioned the appointment of inspectors under the board. The first officer to hold such a position, with the title of Inspector General of Railways, was Lt.-Colonel Sir J. M. Frederick Smith, to whom Lt.-Colonel R. Thomson and Captain S. C. Melhuish were apparently appointed as assistants almost immediately. They were officers of the Corps of Royal Engineers, from which all subsequent Inspecting Officers of Railways have been drawn. Sir Frederick Smith held office only until the following year, and in 1842 Major General Sir C. W. Pasley became the Inspector General.

Wider Powers Recommended

In 1841, Sir Frederick, in association with civil officers of the new Railway Department of the Board of Trade, one of whom was Samuel Laing, later Chairman of the London Brighton & South Coast Railway, reported on the measures which they thought necessary to enable the supervision of railways to be carried out efficiently. They expressed the opinion that the Act of 1840 did not give them sufficient powers, especially in the matter of obtaining information, which so far they had been able to do only by the courtesy of individual companies and their officers; to depend on that would be obviously unsuitable for a Government department; the temptation to concealment is strongest in those cases in which it is most essential to obtain information. At the same time their report outlined the attitude to the general question which they considered the State should adopt, and which has in fact been substantially followed to the present day.

They said, *With regard to the nature and extent of these powers (i.e., the powers to make the railways pay attention to what the Board of Trade considered necessary for safe working) the proper distinction appears to us to be, that the Government should not attempt to interfere in questions of an experimental nature, which are still subjects of discussion, and admit a fair difference of opinion among practical men; nor should it attempt to regulate matters of detail, so as to take the management of the railways out of the hands of the parties immediately responsible, viz., the directors and their officers. On the other hand, the Government should have the power of enforcing, whenever it is found necessary, the observance*

of all precautions and regulations which are approved by experience and are obviously conducive to the public safety. Further on they said *The present Act establishes the principle of Government inspection of railways previously to their being opened for public traffic; but if this principle is to be maintained, it is indispensable to give the Government power to prevent the opening of the railway in case the conditions considered as essential to the public safety are not complied with.*

As the result of the action taken by Labouchere, the Vice-President of the Board of Trade, who applied for leave to bring in a new Bill, another select committee was appointed, before whom, it may be mentioned, I. K. Brunel gave evidence. (This was the occasion when he said he preferred enginemen who could not read or write!) The Bill did not pass, as the Government was defeated on another matter; but in 1842, Gladstone, the new Vice-President of the Board of Trade, introduced one which became law and amended the 1840 Act in some important respects. Power was given to order and direct a company to postpone the opening of a section of railway if the Inspecting Officer saw reason for such a step, under penalty for non-compliance, and all serious accidents, whether attended with personal injury or not, had to be included in the returns. Neither Act sanctioned inquiries into accidents, but such were held, and the first was into the causes of the fatal derailment on August 7, 1840, on the Hull & Selby Railway. An inspector's report on an accident did not then become accessible to the public until the annual reports of the department were issued. Powers of inspection did not come into operation until October 10, 1840, namely, two months after the passing of the Act, and the first recorded official inspection of new works was made by Sir Frederick Smith in November when he went over the Farringdon to Hay Lane section of the Great Western Railway.

Passenger Communication

In 1852, another Select Committee had occasion to concern itself with the accident question, although as a side issue, when James Booth, the Senior Secretary of the Board of Trade, pointed out that its powers stopped with the inspection of a railway; it had no power of examining railway servants compulsorily and, if a railway company should refuse to permit an accident to be investigated, it could not proceed. It was the practice to hold such inquiries and the companies had indeed rendered every assistance. Greater powers, however, did appear to be desirable, but it was doubtful if it was of advantage to give the Board of Trade power to enforce the application of an inspector's recommendations. It was at this time that the proposal was advanced to make some official of every company responsible at law for the safe conduct of traffic over its lines. In 1857, another Select Committee recommended the provision of communication between passengers and those in charge of a train, and an Act of 1868 obliged the railways to fit such equipment on all trains which ran more than 20 miles without a stop; not until 1889 was another Act passed which expressly stipulated the adoption of certain apparatus. The cord system was approved by the Board of Trade, but the approval was withdrawn in 1873; nevertheless, the arrangement con-

tinued extensively until 1899, when—save for some lines which had an electric system in use—the brake actuation method became the official system.

Public opinion continued to be stirred from time to time by accidents, as well as by unpunctuality and other matters in which the railways were felt to be acting dilatorily; further committees and commissions sat, and the desirability of additional legislation was often urged, to compel the adoption of the block system or certain signalling improvements such as interlocking. But it was recognised that railway travelling was actually the safest means of transport ever known, and the Devonshire Royal Commission of 1865 said that only 23 travellers out of 252,000,000 in that year met their death by causes beyond their own control. It added that *as no other mode of locomotion ever used by man can show a more satisfactory result, we are therefore not prepared to suggest any alteration of the present law in this respect.* The commission did, however, recommend that the Inspecting Officers should have power to require the attendance of officers and servants of railways as witnesses, and the production of books and documents; also that their reports should be made public.

In dealing with the general question of safety, it is of interest to note that this Royal Commission (1865) stated that *Parliament has proceeded upon the principle of not attempting to direct the active operations of railway companies, or to give to the Government, either directly or indirectly, any control over the safe or efficient working of the railways . . . companies are free to construct and to work their lines in any manner they choose, provided only that the construction is such at the opening as, in the opinion of an Inspecting Officer of the Board of Trade, will enable the then anticipated traffic to be worked without danger to the public. When the line has been opened for traffic, Government only possess a power of making regulations at junctions between lines of two companies, and where the lines interfere with landowner's interests, as, for instance, at level crossings. But the control over the manner of working the line is left by Parliament entirely in the hands of the railway company. The company in undertaking the duty of carriers become liable under the common law to compensate persons injured, and under Lord Campbell's Act to compensate near relations of persons killed by the negligence either of themselves or their servants . . .*

If to the Government were committed the duty of seeing that the permanent way of the railways was properly maintained, it would be necessary that a large staff of officers should be employed to inspect all the lines with the utmost care and minuteness at very frequent intervals; in short, such inspectors would have to perform duties now performed by the companies' engineers, foremen, and platelayers; such an inspection would require a large establishment unless it were to be a mere superficial and occasional inspection; and just in proportion as the work was efficiently done by Government would the railway companies be relieved from the trouble, expense, and responsibility which they now incur. . . . Witnesses have urged that the Government should receive the power of directing what signals should be adopted on railways, and that they should enforce uniformity of signals on all lines, and, further, that to the Board of Trade should be committed the duty of deciding upon the long-mooted questions as to the form of communication between the guard, engine driver, and passengers. . . . But it is impossible to form any reliable opinion upon questions as to the relative merits of appliances for safety on railways without a long course of trial on a railway, and a full knowledge of all the circumstances attending their use. A Government department can only acquire such knowledge through the

evidence of the railway managers, and thus practically the responsibility of adoption or non-adoption must finally rest upon the managers.

In 1870, another Select Committee was appointed to inquire into the administration of the law of compensation for railway accidents and into the prevention of such accidents; both Colonel Yolland and Captain Tyler gave evidence, and recommended that the practice of holding inquiries into accidents should be legalised. The latter, who advocated non-interference in the affairs of management, also said that if the reports were promptly published he thought that public opinion would so act upon the companies that we shall get all that is required. The result was that another Regulation of Railways Act was passed in 1871, becoming law on November 1, which clarified and extended the intentions implicitly contained in the Acts of 1840 and 1842; inspection was enlarged to cover any additional line of railway, deviation line, station, junction, or crossing on the level on a line that had already been inspected. The procedure as to accidents was also put on a proper basis; and in fact, the Act of 1871, which passed through both Houses without debate, was a most important step relating to safety on railways.

Definition of Notifiable Accidents

By this Act, as amended by the Road & Rail Traffic Act of 1933, the companies are required to give notice of any accident which may occur in or about the railway or any works or buildings connected with such railway . . . that is to say, any accident attended with loss of life or personal injury to any person whomsoever, any collision where one of the trains is a passenger train, any passenger train or any part of a passenger train accidentally leaving the rails, or any other accident likely to cause loss of life or personal injury, and which may be specified in that behalf by any Order made from time to time by the Minister of Transport. (Before the formation of the Ministry of Transport such functions devolved, of course, on the President of the Board of Trade.) The Act of 1933 provides, however, that an accident to a person employed by a railway company need not be notified unless he has been disabled thereby from earning his full wages for more than three days. The Board of Trade proceeded under the Act of 1871 to make fairly comprehensive Orders covering the precise kind of accidents which were to be reported, Orders which were modified from time to time. The Act likewise legalised the holding of official inquiries and the setting up of more formal courts of inquiry in cases of specially serious accidents. The necessity for the latter has but seldom arisen, but a notable instance was the case of the collapse of part of the Tay bridge on December 28, 1879, when a train was precipitated into the river and 73 persons were drowned. This disaster again raised a question which had from time to time been the subject of public comment, namely, whether any further powers ought to be exercised by the Inspecting Officers.

Royal Commission of 1874

In 1873 Earl de la Warr had endeavoured to bring in a Bill to compel the adoption of the block system and interlocking, but a Select Committee reported against the step; an Act was passed, however, which called for returns to be made of how the railways were progressing voluntarily with the installation of those safety systems. In 1874 another Royal Commission, under the chairmanship of the Duke of Buckingham & Chandos, was appointed to go into the whole question of railway safety and working generally; it examined 336 witnesses and asked them 43,443 questions. The continuous brake trials at Newark in 1875 were conducted under its auspices. No legislative

action resulted from the deliberations of this commission, save an Act requiring returns regarding the progress made in installing continuous brakes and the failures of such brakes to act. The commission found that, large as were the powers then possessed by the Board of Trade, they were so adjusted and limited as to leave with the companies the undivided responsibility of working their lines; it had therefore to consider whether the evidence offered to it justified it in advising any departure from that position. Its report, like that of the previous Royal Commission, was emphatic regarding the responsibility for administration and the following extracts are noteworthy:—

Upon full consideration, we are not prepared to recommend any legislation authorising such an interference with railways as would impair in any way the responsibility of the companies for injury or loss of life caused by accident on their lines. To impose upon any public department the duty, and to entrust it with the necessary powers, to exercise a general control over the practical administration of railways would not, in our opinion, be either prudent or desirable. A Government authority placed in such a position would be exposed to the danger either of appearing indirectly to guarantee works, appliances, and arrangements which might practically prove faulty or insufficient, or else of interfering with railway management to an extent which would soon alienate from it public sympathy and confidence, and thus destroy its moral influence, and with it its capacity for usefulness. . . .

Once a railway is opened, the State now holds the company responsible to maintain it, and work the traffic in a manner compatible with the public safety. The Government Inspecting Officers have powers of inspection, and their reports are exceedingly valuable; but to go further and clothe a Government Department with unlimited powers to interfere in the interests of public safety with the detailed working of traffic upon railways, must necessarily create a concurrent responsibility, and in whatever measure this responsibility be cast upon a Government board, the responsibility now resting upon the railway companies will be diminished. . . . We desire then at the outset to express our concurrence with the judgment formed upon this point by the Royal Commissioners of 1865 and to record our decided opinion that any change, which would relieve the railway companies from the responsibility which now rests upon them to provide for the safety of their traffic, would be undesirable.

The Tay Bridge Disaster

After the Tay bridge disaster of 1879, however, the Board of Trade was again obliged to refer to the scope of its powers, and in view of the criticism levelled at General Hutchinson, a minute was prepared on July 15, 1880, and approved by Joseph Chamberlain, the then President. The following extracts are of interest:—

My Lords desire, in the first place, to state that they have always placed entire confidence in Major-General Hutchinson. No more competent, conscientious, and intelligent officer could be found to whom to entrust the inspection of the structure in question, and they are of opinion that his conduct of that inspection has not been such as to forfeit their confidence. . . . The Board of Trade are unwilling to conclude this minute without some general remarks on the policy of the legislation to which they have adverted. It may appear to some that the present state of things is one which cannot be logically defended and that the Board of Trade ought to be entrusted with further powers. The experience of a great number of years has, however, shown that the present system does not work unsatisfactorily, and a little consideration will show that the public safety and convenience would not be promoted by such a change.

In the first place, if the Board of Trade were to be held responsible for the designs of railway structures and for the supervision of their execution, they must employ a staff as experienced, as numerous, and probably as highly remunerated, as the civil engineers by and under whom these structures are now designed and executed. . . . If any public department were entrusted with the power and the duty of correcting and guaranteeing the designs of those engineers who are responsible for railway structures, the result would be to check and control the enterprise which has done so much for the country, and to substitute for the real responsibility which rests on the railway engineer the unreal and delusive responsibility of a public office. . . . To say nothing of the necessary evils of double management, any Government department exercising such control would, if slack in their supervision, appear to guarantee methods of working which might be really faulty and insufficient, and would, if the supervision were more stringent, interfere with railway management to such an extent as to alienate from it the public confidence and destroy with it its moral influence and its capacity for usefulness.

The Armagh Accident and Act of 1889

No change therefore in the legal position took place, but in 1889 public opinion was again deeply stirred by the serious disaster on June 12 at Armagh on the Great Northern Railway of Ireland. A heavily-laden excursion train, consisting of an engine, tender, and 15 vehicles, fitted throughout with the non-automatic vacuum brake, failed to reach the top of a severe gradient. The train was divided to enable it to proceed in two portions, but the rear 10 vehicles were inadequately secured and ran back 1½ miles towards Armagh. The runaway vehicles crashed at great speed into a slowly moving passenger train which had left Armagh 20 min. after the excursion. As a result, 78 persons were killed and 260 more or less seriously injured. The Regulation of Railways Act, 1889, followed very soon after, giving power to the Board of Trade to order the adoption of the block system and the provision of interlocking and continuous automatic brakes; it also gave power to call for returns of hours of duty. Most lines had, however, by then installed extensively these three great safeguards, which, with the passing of this Act, were established on a Statutory basis as fundamental principles of railway working.

Accidents to Railway Servants

The Railway Employment (Prevention of Accidents) Act, 1900, further enlarged the powers of the Board of Trade in the matter of railway accidents generally, and dealt with the use of any plant or appliance which was shown to the satisfaction of the Board of Trade to reduce danger to persons employed on the railway. Should a railway company, however, object to any Order made under these powers, the Order cannot be confirmed and become operative unless the Railway & Canal Commission decides that it is reasonable. As a result of the formation of the Ministry of Transport, under an Act of August 15, 1919, the duties of the Railway Department of the Board of Trade were transferred to the new Ministry on September 23 of that year, by Order in Council. Jurisdiction over Ireland ceased in 1921. The Road & Rail Traffic Act of 1933 brought railway legislation up to date.

It has to be pointed out that tramways in due course came within the scope of the Inspectorate set up by the early Acts above cited, and that their successors, the trolleybuses and their equipment, have in turn done so. The earliest sanction given by the Board of Trade was on March 20, 1871, to a tramway (horse-drawn) between Deptford Bridge (Blackheath Hill) and Greenwich,

authorised by the Pimlico, Peckham & Greenwich Street Tramways (Extension) Act of 1870. The route was inspected by Captain Tyler, but the actual date is not available. The first inquiry into a tramway accident was held by Major-General Hutchinson into a collision which occurred on the Wigan steam tramways on December 29, 1883, between a stationary engine and car and a runaway engine.

The Inspecting Officers of Railways

By the courtesy of Lt.-Colonel A. H. L. Mount, C.B., C.B.E., the present Chief Inspecting Officer, we are enabled to publish the following table, compiled by him after much research into old records, showing the complete succession of officers of the Corps of Royal Engineers from the appointment of Lt.-Colonel Sir Frederick Smith in 1840 down to the present day:—

Board of Trade		1840-1841
*Lt.-Colonel Sir J. M. Frederick Smith	...	1840
Lt.-Colonel R. Thomson	...	1840
Captain S. C. Melhuish	...	1840
*Major-General Sir C. W. Pasley	...	1842-1846
Captain J. Coddington	...	1844-1847
General Sir J. Lintorn A. Simmons	...	1847-1862
Lt.-Colonel Geo. Wynne	...	1847-1858
Captain R. M. Laffan	...	1847-1852
Captain D. Galton	...	1850-1857
Captain H. W. Tyler	...	1853-1876
Colonel W. Yolland	...	1856-1884
Captain G. Ross	...	1858-1861
Colonel F. H. Rich	...	1861-1891
Major-General C. S. Hutchinson	...	1867-1895
Colonel Sir Francis Marindin	...	1877-1899
*Lt.-Colonel Sir H. Arthur Yorke	...	1891-1913
Lt.-Colonel G. W. Addison	...	1894-1899
*Lt.-Colonel P. G. Von Donop	...	1899-1916
†Colonel Sir John W. Pringle	...	1900-1929
Lt.-Colonel E. Druitt	...	1930-1918
Lt.-Colonel G. L. Hall	...	1919-1927
Ministry of Transport		
†Lt.-Colonel A. H. L. Mount	...	1920
Colonel A. H. C. Trench	...	1927
Lt.-Colonel E. P. Anderson	...	1929-1934
Lt.-Colonel E. Woodhouse	...	1930
Major G. R. S. Wilson	...	1935
* Inspector-General of Railways.		
† Chief Inspecting Officer of Railways.		

The choice of Royal Engineer officers, invariably made throughout the whole period, for the important duties involved, has been motived by the wish to secure a wide engineering knowledge, combined with broad general judgment and entire freedom from bias with regard to railway managements, to their employees, or to any interfering interest, so as to secure impartial treatment of the frequently grave issues involved in assessing the full consequences of an accident, or other matter calling for an expression of opinion and the tendering of advice to a Department of the Crown. The results attained and the high standard of safety so happily enjoyed by British railways show that the choice has been more than justified. In 1907 the late Sir Arthur Yorke said that *the relations between the Inspecting Officers and the railway companies are of a friendly nature and the latter do all they can to assist the former in the performance of their duties.* Those relations have remained no less cordial in the years since the above words were written; the railway trade unions, too, have come to place full confidence in the Inspecting Officers and to recognise that railwaymen receive scrupulous consideration in the course of the often difficult investigations rendered necessary by an accident.

Inquiries into Railway Accidents

There is no Statutory procedure laid down for inquiries by the Inspecting Officers, each of whom deals with any particular case in the manner which the circumstances seem best to warrant. Nevertheless, a well-recognised practice has grown up. The trade unions are advised, so that their representatives may attend if desired; the site is visited; in some cases those concerned are questioned on the ground; equipment is examined and an investigation made into every relevant matter. The railway company usually provides accommodation, free of cost to

the Government, for enabling evidence to be heard, with shorthand writers, etc., and all its officers concerned are present at such hearings. The inquiry is not a Court of Law and evidence is not taken on oath; nor is the Inspecting Officer bound by the strict rules of evidence. The admission of the public and the press rests with his discretion; the usual practice is to permit their presence, but should circumstances be such that any railway servant may become involved in a prosecution in connection with the accident, then the proceedings are conducted, wholly or in part, in private, neither the evidence nor the report on the cases being made public until any legal proceedings are concluded or there is no further prospect that they will take place.

A Ministry of Transport inquiry is solely for the purpose of considering the technical cause of an accident, with a view to preventing its recurrence, and is therefore in addition to, and independent of, any proceedings before a Coroner, Magistrate, or Procurator Fiscal (in Scotland). Coroner's inquests, however, act as deterrents, have disciplinary effect, and perform a useful object in railway cases, particularly with regard to the local knowledge brought to bear upon the ensuing recommendations in such matters as level crossings, station facilities, adequacy of fencing, protection of staff, etc.; the Act of 1871 conferred upon the Coroner, when holding an inquest, the right to request the Minister to appoint an Inspecting Officer, or some person possessing special knowledge, to act as assessor, and this occasionally happens, as in the case of the Battersea Park accident, Southern Railway, of April 2, 1937, but does not affect the holding of the usual technical inquiry. Under the same Act the Minister can hold, in lieu of the more usual kind of inquiry, a *formal investigation*, when he may appoint *any person or persons possessing legal or special knowledge to assist the Inspecting Officer, or direct the County Court Judge, Stipendiary Magistrate, Metropolitan Police Magistrate, or other person to hold the inquiry, with the Inspecting Officer or other assessor.* Such investigation must be held in open court, witnesses being examined on oath; as already stated, however, the necessity for this procedure has rarely arisen.

Accident Reports

After his inquiry, an Inspecting Officer must submit a report *stating the causes of the accident and all the circumstances attending the same, and any observations thereon or on the evidence or on any matters arising out of the investigation* which he deems right. While his duty must, if necessary, include criticism of railway staff, he has no power, or occasion, to comment with regard to civil liability. The Minister of Transport is required to *cause every such report to be made public in such manner* as he may deem expedient. It is sent to the railway company concerned, the press or other interested parties, and subsequently appears quarterly in a Government publication; occasionally, as with the serious accident at Castlecary, L.N.E.R., of December 10, 1937, a report is issued as a separate publication at a special price. The form of these reports has not varied very much since 1840. Prior to 1877 evidence was summarised; after that it was given in full, but from July, 1917, summarisation was reverted to.

The opening of the report refers to all the relevant main facts, with possibly a brief statement as to cause; then comes a description to enable the reader fully to visualise the physical and other conditions obtaining; this can be, and often is, simplified by the addition of diagrams and drawings. The following sections then treat of the effects of the accident, condition of rolling stock, the report proper, and the evidence, leading to the conclusions

arrived at, with recommendations and remarks. The Minister of Transport has, however, neither Statutory power nor any other authority to compel a railway company to adopt any recommendations, though in practice such recommendations are always carefully considered and often adopted. The effect of latitude in this respect is to give railway companies discretion in the matter, and this enables the law to be administered without undue interference.

After the passing of the Railway Employment (Prevention of Accidents) Act, 1900, the staff of the inspectorate was enlarged to cover the investigation of accidents to railway servants, and many inquiries are thus held annually by the four Railway Employment Inspectors who are appointed for this purpose. The value of such work depends on its educational and disciplinary effect on railwaymen, and on the publicity which dissemination of the reports gives to the circumstances of each case.

The Annual Report

The Chief Inspecting Officer also submits an annual report to the Minister, who presents it to Parliament; the first of such reports covered the year 1870 and was written by Captain H. W. Tyler; after his retirement in 1876 they were not so comprehensive until 1901, when the statistical information was much strengthened. Sir John Pringle modified the form of the annual report, making it concise but complete and dealing more with the causes of accidents than their number, a course which has been adopted by his successor. Distressing as the casualties resulting from an accident may be, little blame may attach to anyone in the matter, while an accident involving no casualties at all, or possibly but one or two, may

be attributable to gross carelessness or the failure of some apparatus usually found quite reliable, from which circumstance much may be learned of value for the future.

Thus it will be seen that the present Inspecting Officers of Railways are today carrying on an administration that began a century ago. They are responsible to the Minister of Transport for all technical advice upon railway, tramway, and trolleybus matters, and their normal duties consist primarily of the inspection from the safety aspect of new works on railways carrying passenger traffic, and of all new tramway and trolleybus equipment. They are also responsible for holding inquiries, and advising upon all accidents in connection with these three transport services; in addition to these Statutory duties, they act on numerous departmental and other committees dealing with such varied subjects as the safety of railway employees, bridge stresses, permanent way, signalling, electrification, automatic train control, and British Standard Specifications.

During the war of 1914-19, such inspecting officers as were on the Reserve List were called up to take charge of rail transport with the Home Army and various commands. Similarly, one officer was released for Active Service in the present war, while others have joined temporarily, and the inspectorate is at present organised in four sections. Besides exercising the Minister's relative functions, powers, and duties regarding the inspection and safety of railways, tramways, and trolleybus routes, it is now concerned with the maintenance of these undertakings; also with their technical operation and efficiency, their protection, and the adequacy of staff, equipment, supplies, and power, including such matters as the provision of ambulance and casualty evacuation trains.

THE IMPROVEMENT OF THE STEEL RAIL

A comparison of modern European and American methods for the thermal treatment of rails, in order to improve their wearing quality and eliminate internal defects

SOME interesting comparisons of the methods now established for the heat treatment of rails on a commercial scale were made in a paper read recently at the Conference on New Technologies in Transportation (organised by the University of Michigan at Ann Arbor, Mich.), by Mr. J. F. Woschitz, Metallurgist of the Inland Steel Company, Chicago. He pointed out that in the U.S.A. during the past twenty years, although there had been changes in open-hearth practice, ingot-mould design, and soaking pit and rolling mill design and methods, and a reduction in the number and variety of rail sections in use, these have contributed chiefly to a greater uniformity of product. The developments of major importance, however, have been those affecting quality, and in particular those which aim at giving greater resistance to abrasion and immunity from internal defects—that is, at extending rail life despite increasingly destructive wear conditions. Apart from changes in chemical composition, designed to produce a better-wearing steel structure—it is surprising that here the author laid stress solely on carbon hardness as the desideratum, in face of the abundant evidence now available, both metallurgically and practically, that manganese is a more valuable wear-resisting constituent—the latter improvements are concentrated chiefly in the finishing processes, and it is here that the greatest advance has been made in recent years. It is, perhaps, significant that comparatively little has been done in North American rail mills in the full-length quench-hardening of rails; with such high combinations of carbon and manganese as are customary in America, apart from the risk of fissure pro-

duction by quenching in such conditions, the tendency of the rail to pull itself into a considerable camber after such a heat treatment might be difficult to control.

In the three quenching treatments that are applied extensively to rails in Europe—the Sandberg sorbitic treatment in England, the Neuves Maisons treatment in France, and the Maximilianshütte martensitic treatment in Germany—measures to counter this cambering tendency become progressively more drastic as the severity of the quench is increased. In the Sandberg treatment, where the quenching is applied by a mixture of compressed air and very fine water spray, no risk attaches to the treatment of rails of standard composition (which may contain up to 0.60 per cent. carbon in conjunction with 1.20 per cent. manganese), and as was shown in the article in the May 17, 1940, issue of THE RAILWAY GAZETTE on the physical characteristics of the Sandberg rail, the toughness of the rail-head—as measured by elongation in the tensile test and the Herbert pendulum hardness test—tends to increase with the hardness obtained by quenching rather than to be reduced; further, the counter-camber put into a 60 ft. rail to enable it to draw straight in cooling out does not exceed 2 ft. 6 in. to 3 ft. at most. At the other end of the scale the Maximilianshütte martensitic treatment, which involves dipping the rail-head into a trough of water (as described in the December 2, 1938, issue of THE RAILWAY GAZETTE) is so drastic that for the sake of safety it is necessary to make steel of special analysis, containing not more than 0.36 per cent. of carbon and 0.7 to 0.9 per cent. silicon, for

the rails that are to be treated, and even then the contraction on cooling is so severe that a counter-camber of roughly 17 ft. 9 in. has to be put into a 30-m. (98 ft. 5 in.) rail to neutralise the actual camber resulting from the treatment. In America, while whole-rail quenching has been applied on only a very limited scale, a corresponding treatment that is coming into extensive use is the end-hardening of rails to reduce batter at the joints; this is effected by water-jets directed on to the rail-head at the ends, immediately after rolling, reliance being placed on the back-flow of heat from the remainder of the rail into the affected portions to normalise the steel to some extent, and so both to give an even transition of hardness from the hardened to the unhardened zone, and to prevent the development of unduly severe internal stresses. It would not be difficult, of course, to apply such an end-hardening treatment as this by means of the Sandberg sorbitic plant; but while the sorbitic plant is thus in use, a still better plan would be to apply the normal treatment to the rail as a whole, and, simultaneously, by suitable jet or water pressure modifications, a slightly more severe treatment at the ends, if end-hardened rails were desired.

The Causes of Shatter-Cracking

Controlled cooling treatments for rails, now in practically universal use in Great Britain are practised almost as widely in the United States and Canada also. It was in 1911 that the serious risk attaching to the transverse fissure in rails became first recognised in the United States, owing to the rapidly increasing frequency of rail failures (and of resulting derailments of trains) so caused. Whereas in England the investigations of Messrs. Sandberg proved to their satisfaction that transverse fissures were the outcome of a shatter-cracked condition of the rail-head, providing the nuclei which ultimately grew under traffic until breakage of the rail took place, this theory was not regarded as proved in the United States until about five years ago, after the performance of roughly a million tons of rails in the track had been watched and analysed. Messrs. Sandberg were also satisfied that this shatter-cracking was the result of thermal stresses set up in the cooling of an irregular section, and that the susceptibility increased both as the carbon content of the steel was raised, and also if any kind of quenching treatment were applied to the rail. Here again research in America has covered a wide field in an attempt to link other causes with this dangerous phenomenon. It is agreed that the heavier the rail section, so much the more susceptible it is to shatter-cracking, but this is readily understandable, as the cooling stresses in the rail-head are likely to increase as its cross-section is enlarged. The American investigators not only claim, however, that susceptibility to shatter-cracking increases with carbon content, but also that it is greater in medium manganese rails than in low manganese rails; yet this again is not surprising in view of the high combined percentages of carbon and manganese encouraged in American medium manganese rail specifications, considerably greater than the maxima allowed in this country. Other suggested causes are segregation of the elements in the steel, or hydrogen inclusions; investigations have also proceeded as to the relation between shatter-cracking and the degree of oxidation and final deoxidising of the bath in open hearth steel-making, heats with a low slag and a higher residual manganese having, it is claimed, shown a greater tendency to shatter-cracking than more highly oxidised heats. But the evidence in this direction could not be regarded as conclusive.

Neither are these investigations of such serious moment when it has been amply proved that suitable control of cooling, which is a simple and inexpensive operation, can now be relied for the elimination of the tendency to shatter-

crack formation. Curiously enough, the principal authorities do not share identical views as to the range of temperature through which the rail, when cooling, suffers the risk of fissure formation. The Sandberg method of controlled cooling, described and illustrated in the May 17 issue of *THE RAILWAY GAZETTE*, is based on the theory that shatter-cracking is likely to take place between 500° and 350° C. The rails are therefore allowed to cool after leaving the hot saw to about 550° C., after which, in a protected enclosure or oven the cooling is retarded and the temperature throughout the rail section is equalised until it has fallen below 350° C. As mentioned in the article just quoted, the modern method of applying this treatment is by means of an insulated cover which moves slowly across the rails as they lie on the hot-bank, so that there is little or no slowing down of output in consequence. In North America the more general method of applying the retarded cooling is the Mackie process, which assures that shatter-cracks are formed during a lower range of temperature—that is, the so-called "blue brittle" range of 300° down to 200° C. The rails are allowed to cool in air until their temperature has fallen to 500° C., and at any lower temperature that best suits mill convenience (but in any event not lower than 350° C.) they are transferred to cooling boxes of the type described in the issue of *THE RAILWAY GAZETTE*. Sufficient rails are charged into each box to ensure that cooling to 50° C. above atmospheric temperature shall take not less than 15 hr.

However, the American Railway Engineering Association has now produced a tentative specification which is, in effect, a compromise between the Sandberg and the Mackie methods. It lays down that rails shall be charged into the boxes as convenient at a temperature not more than 1,000° F. nor less than 725° F. (540° C. to 385° C.) and shall be cooled at such a rate that at least 15 hr. shall be spent in bringing them down to 300° F. (150° C.). This is, of course, a very much more lengthy treatment than the Sandberg retarded oven cooling, but both have proved themselves equally efficient in eliminating shatter-cracks. One United States works—the Gary plant of the Carnegie-Illinois Steel Corporation—has varied the general American practice by packing the rails for cooling into special insulated gondola cars, instead of into cooling-boxes, which have to be handled by cranes. It may be added that Mr. Woschitz, author of the paper on which these notes are based, is in agreement with the conclusions reached by Mr. Cecil J. Allen in our May 17 issue that tests show controlled-cooled rails to be a little better physically than rails which have been cooled out in normal atmospheric conditions. In rail-breaking tests, the American controlled-cooled rails have required one or two more blows, on the average, before fracture than normally-cooled rails, and there is a tendency to better elongation and reduction of area figures in the case of rails which have had controlled cooling, as well as to higher values for the latter in impact testing, and this with a negligible lowering of Brinell hardness. Controlled cooling has no effect on the grain size of the metal, but the matter of grain size has been the subject of special research by the United States Steel Corporation, who have perfected a process known as Brunorizing, in order to produce steel with a finer grain, better ductility and more toughness. A special aim is to produce a rail which will have great resistance to shock at low temperatures, such as those which prevail in winter over a large part of North America; and the high carbon contents of American rails, to which reference has already been made, render them particularly susceptible to benefit from a normalising treatment of this description. But the plant required for its application makes this a considerably more costly process than retarded cooling.

ELECTRIC TRACTION SECTION

Cost of Electrification

DEALING with the economics of railway electrification in the *Electric Railway Traction Supplement* for June 21, we gave as a specific example of the cost of low-tension d.c. conversion the London—Portsmouth route at £12,000 a track mile including rolling stock, engineering works and the like. This was the figure estimated at the time when the work was well on the way to completion, and Mr. A. Raworth, the Chief Electrical Engineer of the Southern Railway, who was responsible for the conversion tells us that the above figure included certain covering allowances for engineering works for which detailed estimates had not then been prepared. The actual cost of the London—Portsmouth direct line and associated conversions, covering 95 route (242 track) miles, was equivalent to £27,200 per route mile and £10,740 per single track mile inclusive of sidings. Ancillary works were by no means few, and this low cost of electrification may be attributed in the main to the well thought out system of progressive standardisation which has characterised Southern extensions during the past decade.

Electrification and War

IT has always been understood that the reason against electrification of the suburban lines out of Paris in the direction of the eastern frontiers of France was their vulnerability in case of war. The argument was that, if the lines were electrified, it would be necessary only to put one or two central generating stations out of action to stop all traffic. Serious interruption might be caused by damage to even less vital plant, and experience in England does not give much confidence in the theoretical safeguards of a grid system against such contingencies. As events have turned out, however, it appears as if the enemy had been able to inflict sufficient damage by the use of dive-bombing aeroplanes to junctions and other key points of the French steam-worked railways to cause quite as effective disorganisation as any disturbance of electric power supply to electrified lines could. Indeed, the new German tactics of unprecedentedly rapid advance with tanks, cutting across important lines, and extensive bombing far behind the battle area, seem to have immobilised steam-worked no less than electrified railways. Evidently then, the immunity of railways from disorganisation in war, whether they be electrified or not, must be dependent primarily upon a strong military defence against just such weapons and the methods of their use as have been demonstrated during recent months on the Continent. In this connection, the rapid completion of electrification projects in both Germany and Italy, when the imminence of war must have been expected, is remarkable.

Multiple-Unit Practice

LOCAL conditions and requirements govern the design and construction of multiple-unit trains to such an extraordinary extent that it seems hopeless to try to draw any general conclusions even from the largest mass of data. All that can be done is to present such data and leave each engineer to draw from them such conclusions as best fit his own requirements. To that end, the article on the two following pages has been compiled, but we would emphasise that it should not be considered as standing alone, but as supplementary to the tables in the paper on multiple-unit stock read by Mr. H. H. Andrews before the Institution of Locomotive Engineers in March. The change in motor numbers and capacity over a period of years is commented upon elsewhere on this page, but a handful of other features of multiple-unit practice may be run over here. Very close

adjustments of train length to traffic capacity has always seemed only partially attainable, but in recent years there has been a tendency to build more two-car sets, and so provide the smallest basic units. By building two-car and three-car units train formations of any number of coaches from two upwards can be made up—supposing the stock is available at the required place. Station stopping time may be an important factor in reducing schedules, and it is for this reason rather than for any dubious increase in carrying capacity, that open saloon stock is now usual for new construction, even for medium-distance work. Carrying capacity—not seating capacity—is now the openly admitted criterion of efficient use of floor area, instead of being, as it was for years, the secret criterion. More and more use is being made of welded steel in body, frame and bogie construction to gain lightness without sacrificing strength, and electrically-controlled air brakes and the metadyne have increased the retardation rate to twice what it was a score of years ago. Acceleration has been increased by a similar amount by efficient systems of control and greater use of the train weight for adhesion. Automatic control has had some vogue, but the greatest advance relating to control is the mounting of the equipment below the car floor, enabling an appreciable increase to be made in the area devoted to revenue earning, without, except in the case of small tube stock, hampering the accessibility or reliability.

Traction Motors and Train Layout

THERE are few clearer examples of the way in which developments in the design of a constituent can change main principles of application and operation than traction motors for urban, and to a lesser degree, suburban multiple-unit trains. At one time the fewest and biggest motors possible were used, until the outputs reached 360 h.p. on the one-hour rating in the trains of the New South Wales Government Railway. It was argued that the fewer the motors the less opportunities there were for failure, and that the total expense was less. Further, on underground lines, as the flood levels were low, they had to be raised to clear the old traction motors, and the fewer points at which the floor was broken the better it was for passenger accommodation. But within the last eight to ten years, and more particularly in the last five years, progress in design has enabled self-ventilated motors to be built smaller, and the prevailing practice is to use more motors of a capacity below the maximum which could be got between a pair of wheels, until on many subway trains there is a motor on each bogie throughout the train. Such an arrangement is, indeed, imperative if very high rates of acceleration, enough to run 40 trains an hour over one track, are to be obtained, but the improvement began with the motor, and mechanical engineers and traffic officials have not been slow to make use of the advance. Less than eight years ago it was the stated policy of the London Underground to use as few motors as possible, but now, although it cannot be said that the policy is reversed, there are motors all the way down the train so that the desired increases in acceleration, speed and general traffic capacity are limited because of motor capacity. The improvements in motors have been general, and are not confined to one particular detail of assembly. Better forms of self-ventilation, higher-quality insulation, increased armature speeds, welded casings, and the latest bearings all have contributed to producing more power and more reliability out of a given weight and size. Finally, smaller traction motors all the way down the train give the opportunity, as Mr. W. S. Graff-Baker said recently, for all the passengers to ride in reasonable comfort, instead of some very uncomfortably in a heavy motor-coach like a locomotive and others comfortably in a trailer.

Multiple-unit Train Design

Some notes on the characteristics as affected by the floor area, the weight, and the output and location of the electrical equipment

WITHIN the past few years the use of the multiple-unit train has been extended from urban and suburban work to medium-distance main-line operation, e.g., London—Portsmouth on the Southern Railway, and to very high-speed long-distance service, such as the Naples—Milan runs at overall speeds of about 70 m.p.h. Nevertheless the urban and suburban duties still form by far the greater part of the applications of multiple-unit trains and the interest aroused among railway electrical and mechanical engineers by Mr. H. H. Andrews's paper on the subject, read before the Institution of Locomotive Engineers on March 13 (see issue of *Electric Railway Traction Supplement* for March 29), tempted us to go further into the subject of the proportions and ratios of stock for suburban and medium-distance work.

Revenue Area

The chief feature of this investigation proved to be the extraordinary difficulty of obtaining data of a large number of types on a comparable basis; the main results of the investigation are contained in the accompanying Table I. The principal directions in which we have endeavoured to supplement the information given by Mr. Andrews are in the floor area and the revenue area, showing the effect of the disposition of the electrical equipment and the type (saloon or compartment) of the accommodation offered. Area devoted to revenue earning has been taken as including any luggage compartment or corridor, as such can be used for the carriage of parcels and milk, as well as for standing passengers in rush hours. On this basis it is, therefore, representative of the carrying capacity, and it has to be recognised in theory to just the degree it is actually realised in everyday practice, that carrying capacity is the criterion—not seating capacity. Even in compartment stock, up to 45 per cent. of the total passengers carried in a rush-hour train have no seats, and with saloon stock the proportion is much higher.

Compartment and Open Stock

Compartment stock thus loses some of its advantage in giving a large number of seats, and even if one assumes that the carrying capacity per unit of floor area is the same as with saloon vehicles, the impossibility of having air-operated automatic doors makes for slower unloading and loading, although this is modified to some extent by having a larger platform staff and by making the passenger acquire certain habits, as appears to have been done successfully in the London suburban area of the Southern Railway.

There is nothing in the figures presented in Table I to show that compartment stock has a greater or less tare weight per unit of revenue floor area than open carriages. Saloon stock can have a greater proportion of the total area devoted to revenue, but the difference is not great, other things being equal, and lavatories provided in open stock can bring the ratio down. Electrical equipment housed above the floor brings down the proportion of revenue to total area to under 90 per cent. for each train listed in Table I, except under the heading 3,000 volts d.c., in which class the Polish State Railways' train has 96 per cent. revenue area.

Steel Stock

The older forms of all-steel stock, for example, the French Etat sets working out of St. Lazare and built in 1929, and the Delaware, Lackawanna & Western Railroad units constructed nine years ago, make the weight/area and power/weight ratios heavy, and even in such recent units as the Belgian National four-car Brussels—Antwerp trains

(1935) and the newer two-car formations (1939) the weight is extraordinarily heavy. Nevertheless, all-steel construction is no bar to light weight or to favourable ratios involving the weight as one factor, and the new Liverpool-Southport stock of the L.M.S.R. and the twin-car Budd trains on the French National Railways indicate the potentialities.

Traction Motor Ratings

Continuous rating, rather than the one-hour figure, has been taken as the most suitable basis for the traction motor capacity, and this accords with modern practice on the majority of electrified urban and suburban systems, the Southern Railway in this country being the only important user to rate its multiple-unit motors on the one-hour rate. The Southern standard nose-suspended motor is of the totally-enclosed type with a one-hour rating of 275 h.p., and a continuous figure well below the 70-75 per cent. of the one-hour value which is usual for self-ventilated traction motors in general. All the Southern Railway motors have ratings based on 75° C. rise by thermometer.

Variation in Proportions

Several figures given for the equipments listed in Table I may vary owing to differences in train make-up. For example, the Southern Railway three-car sets in rush hours are worked two together with two additional trailers between, making an eight-car formation with less h.p. per ton of tare and much less h.p. per ton of gross weight than the three-car unit. Similar differences can be found to an appreciable degree on the Danish State trains, and differences of a much smaller degree can be found in figures and ratios relating to seating capacity, by reason of the numerous seat layouts usually incorporated in stock built in large numbers.

Among high h.p. per ton of tare values must be noted the French National Michelin car with pneumatic-tyre wheels. The Budd two-car steel-tyre stainless-steel formations on the same railway often used for longer distance traffic and therefore not shown in the table, have a corresponding ratio of 18 h.p., and have a very high overall average acceleration from rest to speeds in the 70-90 m.p.h. range. The 1.5 m.p.h.p.s. acceleration figure given for the Michelin is its normal in service, but the h.p. provided and the grip of the rubber tyres make far higher rates practicable. An acceleration feature of all the modern trains is the ability to maintain the high initial rate up to speeds of 21 to 30 m.p.h.

Greek Electrification.—The Hon. Clive Pearson, Chairman of Whitehall Electric Investments Limited, in his speech at the annual general meeting on June 4, said that on the electrification of the Kephissia Railway the civil engineering works were nearly completed, the rolling stock, signalling equipment, and bridgework were in course of manufacture, and every effort was being made to overcome difficulties in procuring rails and other material.

The Westchester Line.—Operation of the section of the New York, Westchester & Boston Railroad which is within New York City proper is planned to begin next autumn. Work is now proceeding on the change-over of current from 11-kv. single-phase with overhead current collection to 600-volt d.c. from a conductor rail, in order to conform with the standards of the New York rapid transit system. The rolling stock is all to be comprised of rebuilds from old multiple-unit cars obtained from abandoned elevated lines.

TABLE I. CHARACTERISTICS OF SOME MULTIPLE-UNIT TRAINS FOR SUBURBAN SERVICE

TABLE I.—CHARACTERISTICS OF SOME MULTIPLE-UNIT TRAINS FOR SUBURBAN SERVICE

* including income derived as licensee and licensee

TABLE II.—PARTICULARS OF SOME ENGLISH ELECTRIC TRACTION MOTORS

All SBR motor ratings are on basis of 75°C rise by thermometer + Maximum safe speed FF — Full field WF — Weak field

Electric Locomotive Design

Tonnage and electrical ratings with particular reference to overload capacity and performance over varying lines and different services

Two years ago a paper on the trend of recent electric locomotive design was read before the American Society of Mechanical Engineers by Mr. B. S. Cain, and in the course of last year a written discussion on the paper appeared in the Society's journal "Mechanical Engineering." Below are abstracts from the discussion and from Mr. Cain's reply.

MMR. CHARLES KERR (Westinghouse Electric) said that electric locomotives had always been rated in continuous h.p., which was a poor measuring stick of their serviceable capacity, as their inherent overload capacity could always be used to a greater or lesser extent depending on the profile and service. He contended that electric locomotives should be given a further rating based on the average available output from, say, 40 to 100 per cent. speed; on modern units this would average about 50 per cent. higher than the normal continuous rating, and on such a basis the weight comparisons with other types of power were illuminating:

Diesel-electric..	190-200 lb. per h.p.
Steam, including tender	150-160 " "
Electric	50-60 " "

The superiority shown in this small table had brought about what Mr. Cain had called the third phase of electrification in which electric operation could not be equalled by any other form of motive power for main-line heavy-schedule train operation.

Switchback Grade Requirements

An advantage of overload capacity was found in the momentum grade operation of freight trains, but in order to take full advantage of this it was essential to have locomotives which could maintain high short-time outputs at speeds up to 50 m.p.h. It was common practice to set electric-locomotive tonnage ratings calling for the maintenance of running adhesions of 20 per cent. at speeds up to 50 m.p.h., and when working the locomotives to these high limits there was no trouble from stalled trains. Before the advent of the modern high-capacity electric locomotive there existed no machine which could deliver 20 to 25 per cent. adhesion at relatively high speeds.

Cost of Overload Capacity

Mr. A. W. Laird (New York Air Brake Company) said that the author's statement that a locomotive rated at 5,000 h.p. continuously could develop something like 10,000 h.p. for short periods was accurate, but the extent to which the normal rated h.p. could be temporarily increased and usefully applied was sometimes stated much more generously, and justified enquiry into the penalty in electric locomotive weight and cost which might be suffered to provide high short-period ratings. Since temperature rise in the motor armatures was one element which restricted the amount and duration of permissible overload, it was evident that any effort to secure this advantage by liberal design involved added expense. He suggested that if the high overload characteristics were obtainable only at greatly increased locomotive costs, it might be as practicable to secure their equivalents with steam.

Mr. A. I. Lipetz (American Locomotive Company) said that the ability to develop 10,000 h.p. temporarily from a locomotive rated at 5,000 h.p. was dependent upon a power coming from an outside source of about the same magnitude, this cost money. Mr. Cain had made a comparison of electric and steam locomotives of approximately the same power at high speed. For proper comparison the cost of those locomotives, including for the electric locomotives the *pro rata* cost of electrification, should be considered.

Mr. Sidney Withington (N.Y.N.H. & H.R.R.) said that the comparative power-speed characteristics which the author had given might be modified to indicate that by reason of the short-time overload capacity readily available in electric equipment, the h.p. at lower speeds rose considerably faster than it did in steam locomotives, and this was specially valuable where rapid acceleration was desirable.

Riding Qualities

Mr. B. S. Cain (G.E.C.), in replying to the discussion, said that electric locomotive design had been along rather different lines to that of steam, as it was usually necessary to operate equally well in each direction. Modern double-end designs had been brought to a point at which they were at least comparable in performance with single-end types, and tests had shown them to be superior in tracking qualities to some single-end steam locomotives which were considered entirely satisfactory. He agreed with the advantages of the articulated locomotive for high power and high speed, and said that this type was particularly suited to electric drive, and had the additional advantage that by increasing the number of axles the individual axle load could be reduced.

New Ratings Desirable

It had been suggested that electric locomotives be rated so as to bring out more accurately their actual capacity for service, and some such measure was certainly better than the conventional continuous rating. The difficulty was that the true rating was really measured by the tonnage which could be hauled, and the relative tonnage ratings of different types of locomotives were not the same on different profiles. The subject of rating deserved more study because of its fundamental importance in judging the merits of different kinds of power.

Electrical Equipment Characteristics

The high overload capacities of electric locomotives were now being obtained without serious increase in weight or cost. He made no claim that the first cost of an electric locomotive was as low as that of a steam locomotive of equal rated power, but among numerous electrifications in this country and abroad there were enough which were economically justified to show a considerable field for electrification for purely economic reasons. It was fortunate that electrical equipment designed for high starting tractive effort and high speed contained in itself the capacity for high power at intermediate speeds for a time long enough to be really valuable in practical railroading. In reply to Mr. Lipetz, it was to be noted that if two locomotives had the same h.p. at maximum speed, the electric would have more power than the steam at all lower speeds.

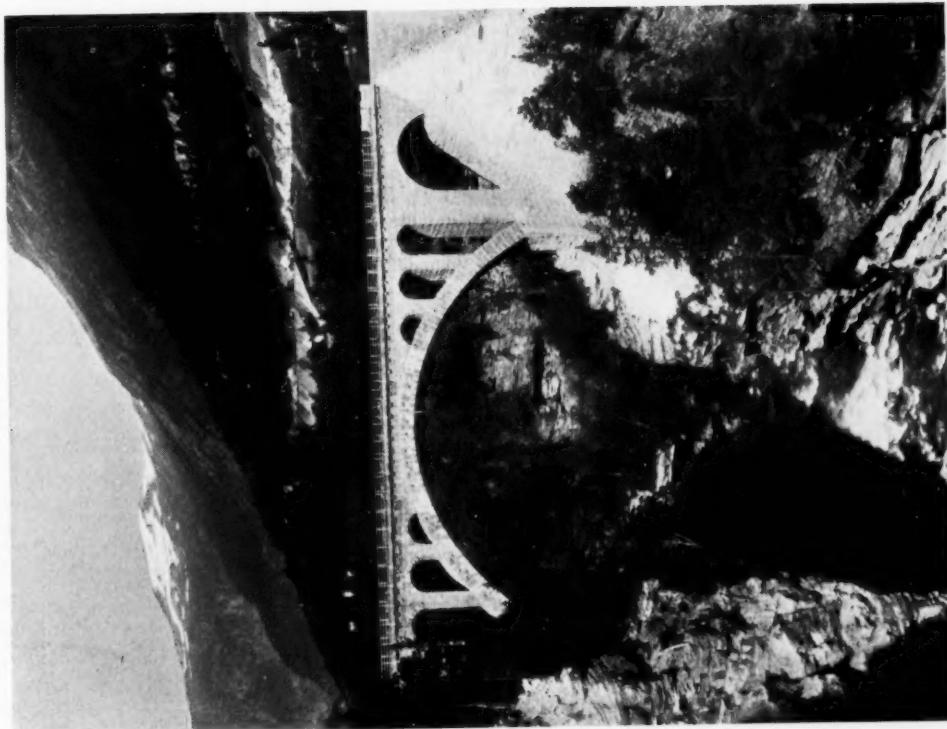


Tunnels, snow sheds and snow fences on the Oslo—Bergen line



The Oslo—Bergen line carried on a mountain side, and protected from avalanches and rock falls by galleries

Norwegian Railway Scenes



Masonry arch bridge carrying the Rauma line to Andalsnes at Kylling over the River Rauma. Note the line beyond rising up the mountain side; the ascent from the lower to the upper section seen is by means of a horseshoe tunnel

LONDON TRANSPORT STEAM LOCOMOTIVES

The stud now comprises 14 units, mainly for working permanent way trains, and includes an 0-4-2 saddle-tank engine built to tube tunnel limits

SINCE the transfer to the L.N.E.R. on November 1, 1937, of the major part of the Metropolitan stock of steam locomotives, the stud of the London Passenger Transport Board has been reduced to 14, which are retained in service for working permanent way trains and for special purposes. The numbers of these locomotives are 30, 31, 34, and 44 to 54 inclusive, and the various classes are as follow: Nos. 30 and 31 are outside cylinder 0-6-0 side-tank locomotives, built in 1931 by the Hunslet Engine Company for the District Railway; they are, for their size and weight, powerful machines with 16 in. \times 24 in. cylinders, 4 ft. 3 in. driving wheels, 852 sq. ft. heating surface, 14½ sq. ft. grate area, 200 lb. pressure, 20,500 lb. tractive effort (at 85 per cent. working pressure), 1,200 gal. water and 1½ tons coal capacity, and a weight in working order of 44½ tons. For working in restricted loading gauges, the height to top of chimney is only 12 ft. 3 in. and the total width over footplate is 8 ft. 8 in. Walschaerts motion is fitted and steam and hand brakes are provided. No. 34 is a curious little 0-4-2 saddle tank locomotive, with outside cylinders, built in 1922 by Kerr Stuart & Company for the London Electric Railway, to dimensions which would enable it to pass through the tube tunnels. It has 9 in. \times 15 in. cylinders, 2 ft. 6 in. driving wheels, 252 sq. ft. heating surface, 5½ sq. ft. grate area, 160 lb. pressure (though normally limited to 140 lb.), 6,500 lb. tractive effort (at 85 per cent.), 270 gal. water and 15 cwt. coal capacity, and a weight in working order

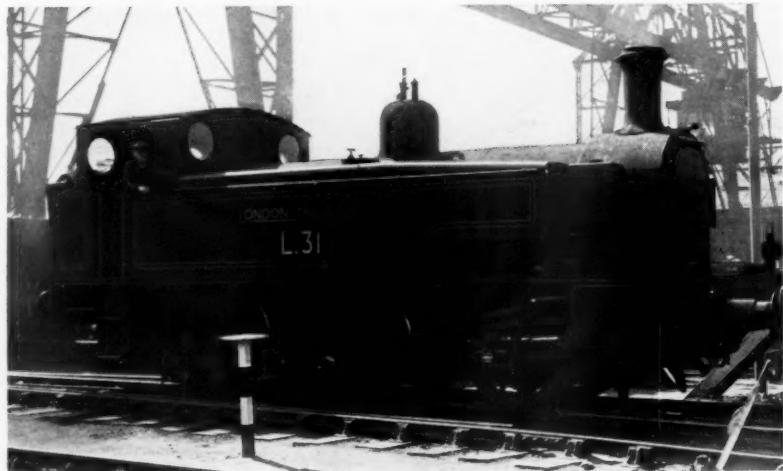
"A." Nos. 44, 46, 47, and 48 (formerly Nos. 1, 77, 80, and 81), are 0-4-4 side tanks of the *ex*-Metropolitan Class "E." Nos. 49, 50, 51, and 52 are 0-6-2 side tanks formerly Metropolitan Class "F." Nos. 90, 91, 92, and 93. Finally, Nos. 53 and 54 are 0-6-0 inside cylinder saddle-tank engines, previously Nos. 101 and 102 in the Metropolitan stock.



Above and left: Two views of 0-4-2 saddle tank locomotive No. L.34, London Passenger Transport Board, built for tube loading gauge



Below: 0-6-0 tank locomotive No. L.31, London Passenger Transport Board, at Lillie Bridge depot. All the L.P.T.B. steam locomotives have the letter "L" prefixed to their numbers



of 14 tons. No. 34 has lately been working in the constructional depot at Drapers Field, Leyton, in connection with the North-East London extension of the Central Line. This engine recalls the two 0-6-0 tank locomotives which were built in 1899 for the Central London Railway, when that line was under construction; these were side tanks with 14 in. \times 18 in. cylinders, 3 ft. 3 in. driving wheels, 562 sq. ft. heating surface, 8½ sq. ft. grate area, and 160 lb. pressure, but with their tractive effort of 12,300 lb. and total weight of 30 tons, were much more powerful machines than No. 34. For working through the tube tunnels, they were equipped for burning oil fuel on the Holden system, and also for condensing. Continuing with the present L.P.T.B. steam stock, No. 45, formerly No. 23 of the Metropolitan Railway, is the last surviving outside cylinder 4-4-0 side tank of the Metropolitan Class

RAILWAY NEWS SECTION

PERSONAL

As notified in *The London Gazette* of July 9, 1940, the King has awarded the Imperial Service Medal to 64 employees in the Department of Transport, Dominion of Canada.

COLONIAL OFFICE APPOINTMENTS

The following appointments are announced:—

Mr. H. A. Dunn, Assistant Traffic Superintendent, has been appointed Traffic Manager, Trinidad Railways.

Mr. H. Sharpe, Senior Assistant Accountant, has been appointed Chief Accountant, Tanganyika Railways.

Mr. C. N. Gallie, Chief Assistant Secretary, Railway Clerks' Association, has been appointed General Secretary in succession to Mr. W. Stott who is retiring in September. Mr. F. W. Dalley, who has been on the secretarial staff of the association for 25 years, has been made Chief Assistant Secretary.

Mr. J. P. Forsyth has succeeded Lt.-Colonel Sir Stanley Paddon, C.I.E., who has retired, as Director-General of the India Store Department as from May 27 last. Mr. Forsyth, who has been Director of Purchase, joined the Store Department of the India Office in 1906. That department was transferred to the jurisdiction of High Commissioner for India in 1920. Since 1913 Mr. Forsyth has been intimately connected with purchases for the Indian State Railways.

Mr. Cardin, Minister of Public Works in the Canadian Government, has taken, in addition, the portfolio of Transport.

M. Macovei has been re-appointed Minister of Transport and also takes the portfolio of Public Works in the newly-formed Roumanian Government.

G.W.R. APPOINTMENTS

The directors have authorised the following appointments:—

Engineering Department

Mr. H. Savage, to be New Works Assistant, Chief Engineer's Office, Paddington (effective from July 5, 1940).

Stores Department

Mr. H. R. Webb, to be Principal Assistant to the Stores Superintendent, Swindon, *vice* Mr. F. H. Dashwood, who is retiring (effective from August 13, 1940).

Mr. C. F. Faith, to be Assistant to the Stores Superintendent, Swindon, *vice* Mr. H. R. Webb (effective from August 13, 1940).

Mr. A. G. Roberts, to be Assistant to the Stores Superintendent, Swindon, *vice* Mr. F. T. Willis, who is retiring (effective from July 8, 1940).

Mr. J. E. S. Bodger, who was appointed Chief Engineer, Way & Works, Ceylon Government Railway, on the retirement of Mr. G. E. Samuels in May, 1939, began his career as a pupil at Peterborough on the Great Northern Railway. He became an Assistant to the District Engineer, Leeds, and from this position joined the Army in 1915, serving in the pioneer battalion in France, Macedonia, and Palestine, on field engineering work, which included light railways, roads and water supplies. Mr. Bodger was mentioned in despatches in 1918. In 1919 he was demobilised and returned to the District Engineer's office, Leeds, where he remained until 1921, when he joined the Ceylon Railway Extensions Department as an Assistant Engineer to work on the construction of Trincomalee Railway. He transferred to the Way & Works Department, Ceylon Government Railway, as an Assistant District Engineer in 1924, and was promoted District Engineer in the following year. He served in various departments, and in 1933 was appointed Assistant Engineer, Way & Works Department, and officiated as Signal Engineer, Way & Works Department, from 1932-1934. In October, 1934, Mr. Bodger was appointed Deputy Engineer, and during the greater part of 1936, while Mr. Samuels was away on leave, and in 1937 when Mr. Samuels was acting as General Manager, Mr. Bodger acted as Chief Engineer, Way & Works. He was confirmed in this position on Mr. Samuels's retirement in May of last year.

We regret to record the death on June 4 of Mr. John V. Neubert, who had been chief Engineer, Maintenance of Way, to the New York Central System, since 1927. Mr. Neubert's jurisdiction was extended over the Cleveland, Cincinnati, Chicago & St. Louis Railway and the Michigan Central Railroad, in 1931.

Mr. E. J. Morris has been appointed Secretary of the Pullman Car Co. Ltd. *vice* Mr. E. A. Ashton, deceased, and Mr. G. N. Bignell has been appointed Accountant.

A report from the Tass Agency, quoted by Reuters, announced on July 4, that M. Lazar Moiseievich Kaganovitch had been released from his duties as People's Commissar for Heavy Industries, and also as Commissar for Oil, in the Soviet Government. He retains his post as Commissar for Railway Transport. M. Kaganovitch is a brother-in-law of Stalin. M. I. L. Sedin has been appointed Commissar for Heavy Industries.

INDIAN RAILWAY STAFF CHANGES

Mr. S. D. Bamjee, officiating Deputy Chief Engineer, E.I.R., has been appointed to officiate as Deputy General Manager of that railway, as from March 6.

Sardar Bahadur Ram Singh has been appointed to officiate as Deputy Chief Engineer, N.W.R., as from April 1.

Mr. A. M. Sims, Deputy General Manager, N.W.R., and officiating Director of Civil Engineering, Railway Board, has been granted 4½ months' leave as from May 16.

Mr. B. C. L. Bean, O.B.E., V.D., Divisional Superintendent, N.W.R., has been granted four months' leave as from June 3, in cancellation of the former notification published in our issue of June 21 at page 869.

Mr. L. E. Vining, Deputy Chief Operating Superintendent, E.I.R., has been granted 11 months' leave preparatory to retirement, as from May 15.

Messrs. W. T. Biscoe, V.D., A. A. Phillips, V.D., and Rai Bahadur R. P. Varma, have been confirmed as Divisional Superintendents on the N.W.R.

The services of Mr. L. N. Flatt (substantively Chief Mechanical Engineer, N.W.R.) have been transferred from the Commerce Department to the Department of Supply, Government of India.

Mr. H. G. Jones, Deputy Chief Mechanical Engineer, Locomotive Running, E.I.R., has been granted 2½ months' leave as from May 5.

Field Marshal The Lord Milne, G.C.B., G.C.M.G., D.S.O., has been appointed Colonel Commandant of the Auxiliary Pioneer Corps.

We regret to record the death on July 8, at the age of 80, of Mr. Charles Ker, C.A., D.L., LL.D., a director of the London Midland & Scottish Railway. Mr. Ker was also a representative for the L.M.S.R. on the L.M.S. and L.N.E. Joint Committee, Group 3. Mr. Ker became a railway director in 1915 when he was appointed to a seat on the board of the Glasgow & South Western Railway. He became Deputy Chairman of this company in 1920. When the railway was absorbed into the London Midland & Scottish Railway in 1923, he was retained on the directorate. Mr. Ker was the Senior Partner of Messrs. M'Clelland, Ker & Co., Chartered Accountants.

CONTROL PORTS IN EIRE.—An Order was made by the Government of Eire on July 10 adding Waterford to the list of controlled ports. Previous Orders have covered Bantry Bay, Cork, Dublin, Dun Laoghaire, and Lough Swilly.

Railways and the War—27

Right: One of the new entrances to the derelict sections of City & South London Railway tube under Borough High Street which have been equipped as air-raid shelters by the Southwark Borough Council (see our issue of June 28, page 904)



Left: One of the new entrance stairways to the Southwark air-raid shelters utilising derelict tube tunnels. Precast concrete segments have been used in the lining of the entrances



Right: Owing to the scarcity and high cost of timber the Ministry of Transport is now preparing a specification for concrete sleepers of the type illustrated, of which some thousands are already on order. Some of them are being purchased by the Office of Works and will be used for laying track to serve Government factories



TRANSPORT SERVICES AND THE WAR—46

Additional Defence Area Regulations—Train service alterations—Irish railway restrictions—Transport on the Continent—Railway air raid precautions

"On what may be the eve of an attempted invasion or battle for our native land, the Prime Minister desires to impress upon all persons holding responsible positions in the Government, in the Fighting Services, or in the Civil Departments, their duty to maintain a spirit of alert and confident energy. While every precaution must be taken that time and means afford, there are no grounds for supposing that more German troops can be landed in this country, either from the air or across the sea, than can be destroyed or captured by the strong forces at present under arms. The Royal Air Force is in excellent order and at the highest strength it has yet attained. The German Navy was never so weak, nor the British Army at home so strong as now. The Prime Minister expects all his Majesty's servants in high places to set an example of steadiness and resolution. They should check and rebuke expressions of loose and ill-digested opinion in their circles, or by their subordinates. They should not hesitate to report, or if necessary remove, any officers or officials who are found to be consciously exercising a disturbing influence, and whose talk is calculated to spread alarm and despondency. Thus alone will they be worthy of the fighting men who in the air, on the sea, and on land, have already met the enemy without any sense of being out-matched in martial qualities."—The Prime Minister's Message.

Mr. E. J. Missenden, General Manager, Southern Railway, in a letter dated July 8, addressed to every Southern Railway officer in a position of responsibility, said: "I command to you the earnest study of this, the Prime Minister's personal message to all holding important posts under the Crown, and in Government Departments. I know I can rely on you to carry out its provisions to the full, and I wish you good fortune and success in the great task which lies ahead of every one of us."

On July 8 also, Mr. Missenden addressed a letter in the following terms to every Southern Railway Local Defence Volunteer:—

"When you go on your Local Defence Volunteer duty I want you to remember that you have my fullest support and approval in the splendid response that you have made to the call of the country at the present momentous time. You are both railwayman and soldier, two services which have behind them traditions second to none in our nation, and which I know you will worthily uphold.

"Yours is a serious task, and it may well be that on you, in the first instance, may depend the successful maintenance and operation of our railway should invasion actually take place.

"Careful and continuous observation at your post, and prompt report of anything unusual are the first duties of the Local Defence Volunteers, and at certain key posts a resolute defence will, if necessary, have a profound effect upon the fortunes of the railway which you have, of your own free will, volunteered to defend.

"Believe me, it is not possible to over-estimate the importance of the work which you have undertaken, and I am certain that you will do your duty as a soldier in the same spirit that you have always done it as a railwayman.

"On a previous occasion a Commander gave his men this message: 'May God grant you courage, gaiety of spirit, and tranquillity of mind.' I can do no better than to repeat these words to you, and to wish you good fortune in all that you do."

West Sussex Coast Restrictions

From midnight on July 2-3 a complete and continuous ban against the use by the public of the beach from Black Rock, Brighton, along the length of the West Sussex coast, was imposed by Order of the military commander for West Sussex. For two days previously a curfew operated from 5 p.m. to 5 a.m. on Brighton beach and southern promenades. The

new Order affects approximately 40 miles of coast, and includes such places as Brighton, Shoreham, Worthing, Littlehampton, Bognor, and Selsey.

More Defence Area Regulations

The Minister of Home Security announced on July 5 that he has made an Order extending the area covered by previous Defence Area Orders to a new area running along the South Coast from Bexhill to Portland, and that directions controlling movement within certain parts of this new area would be issued by the Regional Commissioners concerned. The affected areas are defined as follow:—

The South-Eastern Area, consisting of:—

In Sussex: The Administrative County of East Sussex (except the Boroughs of Bexhill and Rye and the Rural District of Battle); the Administrative County of West Sussex; and the County Boroughs of Brighton and Eastbourne.

The Southern Area, consisting of:—

In Hampshire: The Administrative County of Southampton (except the Boroughs of Aldershot, Andover, and Basingstoke, the Urban Districts of Alton, Farnborough, and Fleet, and the Rural Districts of Alton, Andover, Basingstoke, Hartley Wintney, and Kingsclere & Whitchurch); the Administrative County of the Isle of Wight; and the County Boroughs of Bournemouth, Portsmouth, and Southampton.

In Dorset: The Non-County Borough of Poole; the Urban District of Wimborne Minster; and the Rural District of Wimborne & Cranborne.

The South-Western Area, consisting of:—

In Dorset: The Non-County Boroughs of Blandford Forum, Dorchester, Wareham, and Weymouth & Melcombe Regis; the Urban Districts of Portland, Sherborne, and Swanage, and the Rural Districts of Blandford, Dorchester, Sherborne, Sturminster, and Wareham & Purbeck.

The Regional Commissioners concerned have given directions for the control of movement within certain parts of this area. The districts affected are:—

From July 7: Eastbourne, the Urban Districts of Seaford and Newhaven, the Rural Districts of Hailsham, and the Parish of Peacehaven.

From July 10: The southern part of Hampshire: that is to say, the area south of the road Petersfield—Romsey—Ringwood—Wimborne. The Borough of Poole.

In accordance with the direction given by the Regional Commissioners, any persons entering the foregoing places and districts may be called upon to satisfy the Police or Military that they have a good reason for their journey. Holiday or pleasure visits will not be allowed. No permits are or will be issued for journeys to the controlled areas and no enquiries should be made to Police or the authorities. Intending travellers must ask themselves whether the journey is really necessary, bearing in mind that the orders are not intended to interfere with legitimate business activities or journeys undertaken for other good reasons.

The Southern Regional Commissioner has made an Order closing the sea beaches of Hampshire and the Isle of Wight, and the Dorset beaches from the Hampshire border to Lytchett Bay, Poole. The beaches will be closed from sunset to sunrise to all persons without military passes. The coastline affected includes Southsea, Bournemouth, and other resorts. A curfew from 10 p.m. to 4 a.m. has been placed on Eastbourne front by the authorities. During these hours no one will be allowed on the front, and those living there must use a back entrance if they are not indoors by 10 p.m. No daytime restriction is contemplated at present.

An official of the Ministry of Home Security said on July 5 that the Commissioner for the South Eastern Region had decided to take no action affecting Brighton, which was left

perfectly free. There might be restrictions in certain other towns. No general Order affecting Eastbourne has been made by the Regional Commissioner.

The Southern Regional Commissioner issued the following statement on July 6: Some misunderstanding appears to have arisen on account of the order made prescribing a Defence Area on the South Coast. This order was made only to facilitate the military precautions being taken. As an obvious measure of security, steps are being taken to prevent tourists and holiday-makers gathering in places in which defence measures are in progress. But these steps do not imply that there is any intention of evacuating the resident population nor is it desired that residents should evacuate South Coast towns. On the contrary, the Government is anxious that people should remain in their homes, particularly in defended ports such as Portsmouth and Southampton. People in the Defence Area can best assist the defence of the country by carrying on with their ordinary occupation.

Road Motor Traffic Restrictions

The Minister of Transport has made an Order on July 5 empowering Regional Commissioners to prohibit the use of vehicles or any class of vehicles on any road in their areas. The primary object of the Order is to prevent roads urgently required for military movements being blocked by non-essential traffic. The Order will in the main affect private and other vehicles which are *not* used for purposes essential to the life of the community or the prosecution of the war. The Order also empowers the police and the military to issue instructions as to the routes to be followed by vehicles. It is not contemplated that all roads in a region would be affected by the Order, at any one time, but the Order should be applied to particular roads or areas when military needs require, and for so long as they continue.

The Government announced on July 6 that, if there is an invasion, no private cars or motor bicycles will be allowed on the roads in the districts affected. Once this Order has been given, only private cars or motor bicycles which are engaged on services essential for the prosecution of the war, or the life of the community, may use roads within the forbidden districts. All other private cars or motor bicycles in the districts affected by invasion must be put out of action, and the parts removed must be handed over to authorities at places which will be stated. If this Order is disobeyed drastic measures will be taken to enforce it.

On July 7 an Order was issued by the Eastern Regional Commissioner banning private cars and motor cycles from large portions of Norfolk, Suffolk, and Essex. It was announced that police passes would be issued for cars required for essential purposes. Other cars which remained in the specified areas after midnight of July 7-8 had to be disabled by the removal of essential parts, which had to be deposited at the local council offices. All but authorised traffic has been prohibited on the coastal roads between Bembridge and Yarmouth, Isle of Wight, between lighting-up time and 7 a.m.

Railways and Air Raid Precautions

The Minister of Transport in November last issued the Order required by the provisions of the Civil Defence Act, 1939, specifying the railway companies to which the air raid precautions section of the Act is to apply. That notice specified the four main-line companies and the London Passenger Transport Board, leaving obscure the position of the minor railways and the joint committees which are under Government control. Now, under date June 21, a further similar Order has been made amending the previous one and embracing all the controlled undertakings. It is the first step towards implementing the special provisions of the Act which relate to railways. The Ministry may now require them to report the measures taken, or proposed, to ensure the maintenance of essential railway services and to protect their key personnel. There is no suggestion, of course, that the precautions taken are less than adequate. Rather is the Order now made a necessary stage in the machinery which relates to Government grants towards the cost of essential expenditure of this kind.

G.W.R. Train Service Reduction

The Great Western Railway has temporarily suspended a number of important main-line services. These include the 9.5 a.m. from Paddington to Bath and Bristol and the corresponding return service at 4.30 p.m. from Bristol; the 1.30 p.m. from Paddington to Plymouth and Kingswear and the 4.15 p.m. from Plymouth to Paddington, both *via* Westbury; the 10.45 a.m. and 6.35 p.m. from Paddington to Cheltenham (the 6.30 p.m. from Paddington to Bristol calls additionally at Reading and Swindon to give connection to Gloucester and Cheltenham) and the 2 p.m. from Cheltenham to Paddington; the 5.0 p.m. from Paddington to Plymouth (the 4.15 p.m. from Paddington to Bristol is extended to Plymouth); the 3.55 p.m. from Paddington to Swansea; the 2.45 p.m. from Paddington to Bristol and Weston-super-Mare *via* Devizes and the 8.20 a.m. from Weston-super-Mare to Paddington; the 8.30 a.m. and 12.45 p.m. from Paddington to Wolverhampton *via* Oxford, and the 4.0 p.m. and 5.40 p.m. from Wolverhampton to Paddington. Certain corresponding up trains have also been withdrawn, and various additional stops are made by other expresses in each direction, as, for example, at Didcot and Reading by the 8 a.m. from Penzance to London, and at Chippenham and Swindon by the 11.55 a.m. from Bristol to London. These suspensions became effective on Monday, May 27. On Friday, July 5, the 9.5 a.m. from Paddington to Bristol, 1.30 p.m. from Paddington to Kingswear and Plymouth, 4.30 p.m. from Bristol to Paddington, and certain other trains were reinstated. Owing to heavy traffic several expresses are duplicated regularly; for example, the Penzance and Torbay portions of the Cornish Riviera Limited express are run independently practically every day.

L.N.E.R. Alterations

A supplement of 62 pages has been issued to cover the L.N.E.R. alterations operating from July 1. This includes complete tables of the services between King's Cross and York, York and Newcastle, Newcastle and Edinburgh, Edinburgh and Glasgow, Edinburgh and Aberdeen, Glasgow and Hamilton, and Glasgow and Aberfoyle, on which a number of alterations have been made. On the main line the 9.50 a.m., 12.45 p.m., and 10.30 p.m. duplications between London and Newcastle of the 10 a.m., 1 p.m., and 10.15 p.m. down Scottish expresses are continued, together with the corresponding up services, but there is no restoration of the expresses withdrawn on February 26, at the time of the coal shortage. On Saturdays the 1.15 p.m. from King's Cross to Leeds is divided, the Bradford and Hull portions running as a separate restaurant car train at 1.25 p.m.; similarly the 1.55 p.m. from Leeds to London on Saturdays starts at 2 p.m., and is preceded at 1.52 p.m. by a relief train, without restaurant car, bringing the Harrogate and Bradford portions. A foreshadowed reinstatement from York to Newcastle of the 5 p.m. dining car express from Liverpool has not materialised, and through passengers must therefore wait 1½ hr. at York for the 5.25 p.m. from London, except when the 3.50 p.m. Newcastle relief express is running from King's Cross; this is announced on Fridays only but actually runs almost every day. On Sundays the 11 a.m. express from King's Cross to Edinburgh and the 11 a.m. from Edinburgh to King's Cross both have relief trains over the entire distance, the former at 10.50 and the latter at 11.15 a.m. The 10.50 a.m. down, taking 8 hr. 35 min., is at present the fastest train on the London-Edinburgh service.

L.M.S.R. Train Service Changes

From July 1 the 2.50 p.m. express from Euston to Manchester is diverted from Colwich by the direct route to Stoke, and ceases to call at Stafford, which is served by the 2.40 p.m. from Euston. The 8.50 p.m. from Euston to Holyhead starts at 8.45 p.m., and the 1.30 a.m. from Holyhead to Euston at 11.45 p.m., with an arrival in London at 6.10 instead of 7.25 a.m. First and third class sleeping accommodation is provided on the 9.25 p.m. from Euston to Glasgow as well as on the "all-sleeper" 9.15 p.m. train. There is some amplification of the daily services in the Abergavenny-Bryn Mawr-Ebbw Vale-Merthyr area. In addition to the special weekend holiday services between towns in the Midlands and the west coast, a number of additional services are announced on

Saturdays to run from the beginning of July to mid-September, including the 8.30 a.m. from Birmingham to Llandudno, 9.10 a.m. Leamington Spa to Blackpool, 8.30 a.m. Sheffield to Llandudno, 2.45 p.m. Manchester to Llandudno, 4.10 p.m. Liverpool to Llandudno, 4.45 p.m. Crewe to Llandudno (in connection with the 1.10 p.m. from Euston), and 10.50 a.m. Nottingham to Llandudno; there are also additional services on Fridays, at 3.40 p.m. from Manchester to Llandudno, at 1.40 p.m. from Liverpool to Llandudno, and 4.45 p.m. from Crewe to Llandudno. Corresponding services run in the reverse direction. The 5.0 p.m. dining car express from Liverpool (Lime Street) to Newcastle via Huddersfield and Leeds terminates at York. On the Midland Division the 9.15 p.m. express from St. Pancras to Edinburgh and the 9.15 p.m. from Glasgow to St. Pancras both call additionally at Wellingborough; the 9.18 a.m. express from Sheffield to St. Pancras ceases to call at Bedford. Bolton Abbey station, on the Ilkley to Skipton line, is closed. A number of additional trains is run on Sundays for recreational purposes, including three in each direction between Barrow and Coniston, two between Barrow and Lakeside, and between Barrow and Kendal, Stoke-on-Trent and Chester, and in various other directions; also a 20-min. interval service is run throughout the day on Sundays between Liverpool and Southport. There are many other alterations and additions to services, occupying a closely-printed pamphlet of 71 pages.

Traffic in Ireland

The restrictions imposed by the Government of Northern Ireland from July 1 were at first interpreted by some as amounting to an almost complete ban on travel between Eire and Ulster, but it has now been made clear that there is no desire or intention to place obstacles in the way of *bona fide* travellers or holidaymakers who wish to enter the six counties of Northern Ireland. In effect, any visitor from Eire must satisfy the Northern Ireland authorities on request that his visit is not for purposes which would be detrimental to the maintenance of peace and public order. Provided the traveller is in possession of one or other of the identity documents detailed at page 17 of last week's issue, no severe restriction on travel between Eire and Northern Ireland is being exercised.

Irish Summer Train Services

There are some notable innovations in the summer train services of the Great Northern Railway of Ireland. Owing to the increasing popularity of various Northern Ireland coast resorts, a special express is now run on Saturdays at 10 a.m. from Dublin to Belfast, allowed 2 hr. 40 min. with five intermediate stops. This express carries as far as Lisburn a through section for Portrush, with tea car to Antrim, a through portion for Londonderry via Portadown, and through coaches for Bangor via the Belfast Central and B. & C. D. lines. The schedule includes what for the time being is the fastest booked run in Ireland—Drogheda to Dundalk, 22.5 miles start to stop in 23 min., at 58.7 m.p.h.,—and the 54.3 miles from Dublin to Dundalk are covered in 62 min., including a 3 min. stop at Drogheda. The 9 a.m. express from Dublin, which on weekdays has a Portrush portion, on Saturdays carries a section for Newcastle, which is detached at Goraghwood, and runs thence non-stop, reaching Newcastle at 12 noon. In the reverse direction departure from Newcastle is at 1.50 p.m., and the through train is worked non-stop from Banbridge to Dundalk, where it is attached to the first portion of the 2.45 p.m. from Belfast; the latter runs non-stop over the 58.2 miles from Belfast to Dundalk, and reaches Dublin at 5.10 instead of 5.30 p.m. The second part of the 2.45 p.m., starting at 2.55 p.m., carries the through coaches from Bangor to Dublin, and attaches at Lisburn the through section from Portrush via Antrim. The usual through summer facilities are given in each direction between Dublin and Bundoran. On Wednesdays and Saturdays a non-stop express is run from Belfast at 2.30 p.m. for Warrenpoint, taking 70 min.; return is at 8.30 p.m., with stops at Portadown and Lurgan. On the Great Southern Railways the 12 noon from Cork to Dublin on Sundays is altered to leave at 4 p.m., and has a new connection from Limerick at 5 p.m., reaching Dublin at 9 p.m.

British Wartime Traffic

Despite the heavy pressure of troop movements, munitions, civil evacuation, and other special wartime traffics, the British

railways are also breaking all records in the conveyance of coal. According to a statement issued by the Railway Executive Committee, the most intensive summer working of coal trains ever known is being undertaken in order to meet the growing demands of trade and industry, to cope with coal previously carried from one part of the country to another by coastwise steamers, and to enable merchants and householders to replenish their stocks in preparation for next winter. It is the first time in their history that the railways have conveyed a summer coal traffic which is actually greater than the winter level. Since the railways began, at the end of February, to run special daily coal trains to the requirements of the Ministry of Mines (over and above the normal daily working), over 2,200 such trains have been operated, up to the middle of June. In a recent four-weekly period more than 80,000 loaded coal wagons were brought into the London area alone—an increase of nearly 100 per cent. compared with the same period of the previous year. Much of this great increase is accounted for by the diversion to rail of coal which previously reached London by sea. Another special wartime feature is the heavy working of coal traffic on Sundays. Sections of line which on peacetime Sundays carried many excursion trains, now accommodate coal trains of as many as 90 wagons. Marshalling yards are also very busy on Sundays nowadays; modern layout and equipment enable a 90-wagon train to be sorted out into as many as 30 separate cuts of wagons, in as few as 20 min.

Transport on the Continent

A skeleton railway service has been re-opened between Paris and Brussels, according to a dispatch from Brussels dated June 6 from the Official German News Agency. It is stated that the service is at present limited to one train a day and is reserved for German troops.

It is reported that railway traffic has been greatly improved in the southern regions of France, namely, those under the control of the Vichy Government, and traffic is reported to have been resumed over practically the whole of the unoccupied area. A Madrid message says that the German authorities have closed the Franco-Spanish frontier and that no one has been allowed to pass from France to Spain since July 8. Another report states that on July 2 a German motorised column replaced the French Customs Officials in the Faucille Pass, above Geneva, and that all French frontier posts in the Gex district, east of the Jura mountains, have been taken over by German sentries. British mails to Switzerland have been resumed, but are subject to enemy censorship.

It is reported that on June 26 the Soviet troops took over from the Lithuanian Forces the guarding of the Lithuanian-German frontier.

The first hospital train conveying war wounded is reported to have arrived in Rome on July 1.

A Swedish statement issued on July 5 said that, hostilities having ceased in Norway, the restrictions caused by the war in regard to transit to and from Norway through Sweden had been removed, and that merchandise of all kinds might now be sent via the Swedish railways. The same right of transit, it was added, would be accorded to German soldiers on leave. In amplification of this statement, the Swedish Prime Minister said that German soldiers on leave travelling from Norway to Germany, and possibly also returning, would be conveyed "in special carriages, without arms, and generally in such a way as to exclude difficulties or friction."

According to the Moscow radio of July 3, traffic in Bessarabia has been resumed on the main east-west line from Tighina (Benderi) to Ungheni via Chishineu (Kishenev), and the north-south branch to Basarabeasca. It is stated that the gauge of the Benderi-Chishineu section has been widened to the Russian standard of 5 ft. so that Soviet rolling stock may be used. Practically the entire rolling stock was evacuated from Bessarabia by the Roumanians, the radio added, and only seven locomotives and 20 trucks were left behind on the Bessarabian main line. The Moscow radio stated on July 5 that normal train services would shortly be resumed between Roumania and the Soviet Union. Another message, of July 7, stated that all Roumanian oil tank wagons are being placed at the disposal of Germany.

QUESTIONS IN PARLIAMENT

Rail Accommodation for Troops

Mr. R. W. Sorensen (Leyton West—Lab.), on July 2, asked the Secretary of State for War whether he would arrange that soldiers going on, or returning from, leave whose journey was lengthy should be permitted to use vacant first class seats when other seats were not available.

Mr. Anthony Eden (Secretary of State for War): I am advised by the Minister of Transport that the railway staff have latitude, if a train is seriously overcrowded, to allow serving members of the Forces to occupy available seats in first class compartments.

Lieut.-Colonel Sir Thomas Moore (Ayr Burghs—C.) asked the Minister of Transport what arrangements existed to ensure that troops, when travelling by ordinary passenger trains, were provided with adequate seating accommodation.

Mr. F. Montague (Parliamentary Secretary to the Ministry of Transport): When the railway companies have prior knowledge that bodies of troops are to travel by ordinary train they make arrangements to ensure that adequate seating accommodation is available for them. It is not always possible to provide seating accommodation when numbers of troops appear without notice.

Sir T. Moore: Irrespective of where the responsibility lies, is not the Parliamentary Secretary aware that it is the common and very disturbing experience of all night travellers from Scotland to see our troops standing all night without any possibility of being able to sit down during the journey?

Mr. Montague: I think Sir Thomas Moore is aware that attention is being specifically given to that very point, and we quite appreciate its importance.

Mr. H. W. Butcher (Holland-with-Boston—Nat. Lib.), on July 3, asked the Minister of Transport whether he would instruct the main-line railway companies that where all third class seating accommodation was occupied and first class seats were vacant, serving soldiers, sailors, and airmen were to be permitted to use such seats without extra charge.

Sir John Reith (Minister of Transport): I have consulted the Railway Executive Committee on this suggestion. They advise that, as a general rule, third class travel cannot be permitted in first class compartments, as the railway companies are bound to provide first class accommodation for officers of H.M. Forces and others holding first class tickets. They point out that this applies not only at terminals but at intermediate stopping places. But, as indicated in the reply to Mr. Sorensen, when notice is given of troop movements arrangements are made to provide adequate seating accommodation. In the event, however, of a train being seriously overcrowded, latitude has been given to the railway staff to allow

serving soldiers, sailors and airmen to use first class seats where available.

Mr. Ralph Etherton (Stretford—C.), on July 3, asked the Secretary of State for War what new arrangements had been made effective since Wednesday last with regard to the comfort of troops at London and provincial railway termini.

Sir Edward Grigg (Joint Under-Secretary of State for War): I would refer my hon. friend to the answer given yesterday to my hon. friends the Members for Gateshead (Mr. Magnay) and English Universities (Mr. E. Harvey). I can now add that proposals for bringing the canteen and rest room facilities at Liverpool Street and Paddington stations up to the required standard have been prepared. The Minister of Transport informs me that the two railway companies concerned have willingly agreed that the required additional accommodation shall be made immediately available. Certain necessary structural alterations are being put in hand forthwith.

Sir Thomas Moore (Ayr Burghs—C.): Are the War Office or the railway companies responsible for providing these services?

Sir E. Grigg: The welfare of the troops is a War Office responsibility.

Mr. R. De La Bere (Evesham—C.) asked the Secretary of State for War whether, in connection with facilities for troops at London railway termini, he would consider the desirability of placing all arrangements at the different railway termini for the proper reception of troops under the respective General Officer Commanding-in-Chief, particular attention being paid to London.

Sir Edward Grigg: The general arrangements for the welfare of troops at railway stations now being made with the railway companies must necessarily be dealt with centrally by the War Office in consultation with the Ministry of Transport, but this in no way impairs the responsibility of General Officers Commanding-in-Chief for ensuring the welfare of troops in their Commands in accordance with approved policy.

London-Manchester Service

Mr. N. B. Goldie (Warrington—C.), on July 2, asked the Minister of Transport whether, with a view to relieving the existing congestion on the passenger-train service between Euston and Manchester, he would make representations to the London Midland & Scottish Railway Company with a view to the acceleration of at least one train daily on the alternative route to and from St. Pancras.

Sir John Reith (Minister of Transport) in a written reply, stated: I am advised that, whenever there is reason to expect exceptional traffic between Euston and Manchester, the scheduled trains are strengthened or duplicated, and that congestion is not frequent. The service between St. Pancras and

Manchester is designed not as an alternative to the Euston-Manchester service, but to serve important towns on the route. It could be accelerated only by cancelling the stops at some of these towns and thereby reducing existing facilities, which would cause more inconvenience than it would remedy.

Steel Rails

Lieut.-Colonel Sir Thomas Moore (Ayr Burghs—C.), on July 3, asked the Minister of Transport if he had made a survey of all the superfluous and derelict steel rails throughout the railway systems of the country, with a view to utilising them for the war effort.

Sir John Reith (Minister of Transport): My Department has considered this matter with the Railway Executive Committee. Any superfluous but still serviceable rails are used in the construction of sidings and other emergency works needed for the war. Unsatisfactory rails are handed over to the Iron and Steel Control.

Stratford Railway Works

Mr. T. E. Groves (Stratford—Lab.), on July 4, asked the Minister of Transport if he would state the number of workmen who had received notice of termination of service at the Stratford railway works; the number of men who had been transferred to other spheres of activity; and whether such men had received assurances that their pension rights had been safeguarded.

Sir John Reith (Minister of Transport) wrote in reply: I am informed that 23 men at the Stratford works have received notice of termination of their services; 21 of these men have been found employment in other works. Forty-seven men from the Stratford works have been lent to outside firms for work of pressing national importance; these men will continue to receive the privileges, including pension rights, which they enjoyed at Stratford.

Mr. Groves also asked the Minister of Transport whether he was aware of the anxiety prevailing about the Stratford railway works, owing to the depletion of staff there; if he would cause enquiries to be made into the fact that, although this was an up-to-date works department with efficient machinery and a staff eager to play its part, orders were slackening and the staff being, in part, transferred; and whether he would ensure that this practice ceased.

Sir John Reith wrote in reply: I understand that the railway company have fully discussed the position with the railway trade unions concerned who appreciate the necessity for the action which has been taken.

Railways and E.P.T.

Mr. Watkins (Hackney, Central—Lab.), on July 10, asked if the Minister of Transport would state the effect of the proposed 100 per cent. Excess Profits Tax on the terms of the White Paper Cmd. 6168.

Sir John Reith: The arrangements in the White Paper in no way affect any liability of the controlled undertakings to excess profits tax.

Railway and Other Meetings

British Electric Traction Co. Ltd.

The ordinary general meeting of the British Electric Traction Co. Ltd. was held at Winchester House, E.C.2, on July 5. Mr. J. S. Austen, Chairman of the company, presided.

The Secretary, Mr. R. P. Beddow, having read the notice convening the meeting and the report of the auditors,

The Chairman said: If I had been making this speech some six months or so ago, most of my time would have been occupied in explaining to you the reasons which prompted the directors to suspend the operation of our stock bonus scheme, but owing to recent legislation, it is not necessary for me to do more than to say that we anticipated the action of the Government. I am glad that we did so because it enabled us to pay an interim dividend which some of us, at least, were glad to receive.

My speech today will be short, but I am hoping to tell you just exactly what you want to know, and I think that what you most particularly want to know is what the position of the company will be when we have to pay 100 per cent. Excess Profits Tax, or to put it in simpler words, you want to know what our dividend will be. I can tell you that in one word by saying that we should be in a position to pay 45 per cent. on the deferred ordinary stock. The deferred stock is now really in the position of a preferred ordinary stock which is entitled to receive 45 per cent., after which the Government takes the balance.

If the 100 per cent. tax had operated in respect of the past year, we should have been able to pay the deferred stockholders 45 per cent., as we are doing, and there would have been £80,000 to go to the Government in Excess Profits Tax. That means that our profits would have to fall to the extent of £80,000 before your dividend is affected. We are at least entitled to hope that there will be no such falling off as that, but I must ask you to be content with that statement, because in these times anything like prediction is out of the question. I am not even going to tell you how our buses are doing, because if I did so I should have at the same time to mention all sorts of possible eventualities which would leave you in the end not much wiser than you were before, and, indeed, some of those eventualities it would be undesirable to discuss.

I have but little to say about the past year beyond pointing out to you that our gross revenue was £745,000, and that it is not so very long ago that, with some pride and pleasure, I told you that we had passed the £500,000 mark. That increase in revenue has been accomplished without any—or practically any—rise in expenses. We have already told you that our working profit is up by £16,000 compared with the previous year, and that is not a war profit, because but for the war our receipts would have been greater.

Now for a moment I must become a little personal. You probably know, or at least surmise, that I have reached an age when I ought to be upon the shelf. (Shareholders: No.) Well, I am not on the shelf. There is still some work left in me, and at this time we are all of us wanting to do a little something. As I am too old to tackle a new job, I am sticking to the old one. I am even vain enough to think that you will wish me to do so. (Hear, hear.) I am more than sorry that I am unable to address you today in the strain which I have used in the past, but I am quite sure that you do not expect me to do so.

The Chairman then moved the adoption of the report and accounts.

Mr. Richard J. Howley (Deputy Chairman) seconded the resolution and it was carried unanimously.

The retiring directors were re-elected and the auditors reappointed.

Great Southern of Spain Railway

The ordinary general meeting of the Great Southern of Spain Railway Co. Ltd. was held at River Plate House, 13, South Place, E.C.2, on July 4, Mr. C. H. Pearson, the Chairman, presiding. The Secretary, Mr. F. P. Higgs, read the notice convening the meeting and the auditors' report. The Chairman, in moving the adoption of the report and accounts, referred to the critical position of the company, due to the seizure of the railway during the civil war. Funds were virtually exhausted and it was quite impossible to resume normal working without some recognition by the Spanish Government of the just claims of the company, but up to the present all representations had been ignored. The whole future of the company depended on an equitable settlement of those claims, and in existing conditions no forecast could be made. In the circumstances the figures in the balance sheet could not be taken as representing the real position of the company's affairs. The Debenture Stockholders' Committee had recently exercised the power vested in it to extend the provisions of the 1934 Moratorium Scheme and the 1938 Scheme of Arrangement, temporarily postponing interest and suspending sinking fund on the first mortgage stock, to December 31, 1941.

Staff and Labour Matters

Busmen's Wages

Arising out of a claim, submitted by the employees' representatives, for an increase of 6s. a week in the wages of employees of municipal passenger transport undertakings, the National Joint Industrial Council for the industry, on July 5, agreed to an increase of 3s. a week, with corresponding increases for those below 21 years of age. Early in December of last year municipal bus employees received a war bonus of 4s. a week and the increase now granted brings

the total bonus up to 7s. a week for adults. Similar increases have also been granted to London Transport employees and the employees of the company-owned buses.

Women Bus Conductors

London Transport is to employ women conductors on the Country (green) buses and the Green Line coaches. Women are invited to apply personally at any of the board's country garages. Applicants must be between the ages of 23 and 35 and wages will be £2 14s. a week, with war wage on commencing, rising to £3 4s. a week with war wage.

Payment of Wages During Illness

An appeal against the decision given by a county court judge was allowed by the Court of Appeal on July 4, in a case in which claim was made for £45, being 15 weeks' wages at £3 a week, which the claimant alleged to be due to him in respect of pay when he was incapacitated from work owing to illness. The county court judge found that there was no express or implied term in the plaintiff's agreement which prevented the normal rule from applying, and gave judgment for the amount claimed.

Lord Justice MacKinnon, in giving judgment, said that he thought that *Morrison v. Bell* had been unnecessarily reported. It appeared to have been misunderstood as laying down a principle of the common law with regard to the right of a servant to wages during illness. In such a case as the present no principle was involved. The only question was what were the terms of the contract between the employer and employee. The whole difficulty was to ascertain what were the terms of the contract. When a term was not expressed it might be necessary to ascertain it as a matter of implication. In the present case there seemed to be abundant evidence that it was a term, not expressed, but undoubtedly implied, that the plaintiff should not be paid while sick. If one had to discover what were the implied terms of such an agreement one had to ask oneself what, if the question of pay during illness had been raised when the bargain was originally made, would both parties have said about it. What they would have said here was, he thought, conclusively proved by what they did when the event arose. When the servant was away ill he was not paid wages. He acquiesced in that, and as he said in evidence, he did not think that he ought to have wages and did not expect to get them. Therefore, on the question of fact, which was the only question involved in the case, he (his Lordship) came without hesitation to the conclusion that the servant should be paid not merely when he was ready and willing to work but when he did work. That being so, the appeal must be allowed, and judgment entered for the defendants.

NOTES AND NEWS

Railway Benevolent Institution.—It has been decided by the board of management of this institution that, having regard to the urgent need for the conservation of paper, the annual report will not be published this year.

N.U.R. Credit Balance.—In his financial report on the funds of the National Union of Railwaymen, Mr. J. Marchbank, the General Secretary, says that the credit balance of the general fund at £736,655 "has at last exceeded the 1925 figures of £727,019. . . . The general strike in 1926 created a general fund debit balance of £746,933."

Sir John Norton-Griffiths & Co. Ltd.—A general meeting of the members and a general meeting of the creditors of this company, now in voluntary liquidation, will be held at the offices of Messrs. Wild, Collins & Crosse, Kennan's House, Crown Court, Cheapside, E.C.2, on Wednesday, July 24, at 12.15 p.m. and 12.30 p.m. respectively.

Irish Railway Rate Increases.—By order of the Railway Tribunal (Dublin) made pursuant to Section 31 of the Railways Act, 1924, increases in certain rates and charges for the carriage of merchandise by merchandise train came into force on July 1 on those portions situate in Eire of the Great Northern; Sligo, Leitrim & Northern Counties; Dundalk Newry & Greenore; County Donegal; and Londonderry & Lough Swilly Railways.

Argentine Railway Earnings.—The gross earnings of the Argentine railways for the first eight months (July-February) of the financial year 1939-40, amounted to 327,784,000 pesos, or 3,721,000 pesos (1.1 per cent.) more than in the corresponding period of the previous financial year. Of the total, passenger receipts accounted for 65,289,000 pesos, or 599,000 pesos (0.9 per cent.) less, but goods receipts, 229,031,000 pesos were 5,904,000 pesos, or 2.6 per cent. more. Passengers numbered 109,315,000, that is, 903,000, or 0.8 per cent., more than in the preceding

period, while goods traffic, with 28,834,000 tons, showed an increase of 884,000 tons, or 3 per cent.

Anti-Concussion Bandeau.—Dunlopillo cushioning is used to absorb blast in an anti-concussion bandeau which has been designed to give protection to the areas of the brain particularly sensitive to shock and also to the ear drums. The blast is absorbed by the small intercommunicating air cells of the soft aerated rubber and distributed throughout them all, and every cell absorbs a portion of it.

Canadian Pacific Earnings.—Gross earnings of the Canadian Pacific Railway for May, 1940, amounted to \$13,512,000, an increase of \$1,518,000 in comparison with May, 1939. Working expenses totalled \$11,048,000, or \$961,000 more, leaving net earnings \$557,000 higher, at \$2,464,000. For the first five months of 1940 aggregate gross earnings were \$61,193,000, an increase of \$9,739,000 in comparison with the first five months of 1939, and the net earnings of \$8,713,000 showed an advance of \$5,425,000.

Tecalemit Limited, 1923.—A general meeting of this company will be held at Great West Road, Brentford, Middlesex, on July 29, to receive the account to be presented by the liquidator (Mr. R. A. Chalmers), and to consider and, if thought fit, pass the following resolution as an extraordinary resolution of the company: "Resolved that the books, papers, and documents of the company and of the liquidator be handed over to Tecalemit Limited (Incorporated in 1934) to be disposed of as the directors of that company shall determine."

Southern Railway Extensions of Time Application.—The Southern Railway company is applying to the Minister of Transport for an Order under the Special Enactments (Extension of Time) Act, 1940, extending by three years from October 1, 1940, the time as now limited by: (1) Section 31 of the Southern Railway Act, 1935, for the completion of (a) Railways Nos. 3, 4, 5, and 6 and Widening Nos. 2, 3, 4, 5, and 6 and Widening Nos. 2, 3,

4, and 5 authorised by the London Brighton & South Coast Railway Act, 1903, and (b) the railway authorised by the Southern Railway Act, 1930; (2) Section 8 of the Southern Railway Act, 1935, for the completion of Railway (No. 1) by that Act authorised; (3) Section 34 of the Southern Railway Act, 1937, for the acquisition of lands required for the railway authorised by the Southern Railway Act, 1934, namely the Folkestone-Dover deviation railway.

British and Irish Railway Stocks and Shares

Stocks	Highest 1939	Lowest 1939	Prices	
			July 9, 1940	Rise/ Fall
G.W.R.				
Cons. Ord. ...	38	21½	29½	+2½
5% Con. Pref. ...	92	71	68	+7
5% Red. Pref. (1930)	98	83	90½	-2
4% Deb. ...	103	91	99	+5½
4½% Deb. ...	105½	93½	98½	-
4½% Deb. ...	111	99	100	-
5% Deb. ...	121	109½	109	+2
2½% Deb. ...	63½	55	58	-
5% Rt. Charge ...	111	104	104½	-5
5% Cons. Guar. ...	111	96½	100	+4
L.M.S.R.				
Ord. ...	17	9½	12½	-1
4% Pref. (1923) ...	46½	20	29	+2
4% Pref. ...	63½	37½	43	+2
5% Red. Pref. (1955) ...	83	58½	64½	-1
4% Deb. ...	98½	85	95	+8
5% Red. Deb. (1952) ...	109	101½	104	-
5% Guar. ...	87½	73	78½	+9
L.N.E.R.				
5% Pref. Ord. ...	52	3½	24	+2
Def. Ord. ...	39	19½	14	-
4% First Pref. ...	38½	19	24	+2
5% Second Pref. ...	15	7½	9	-
5% Red. Pref. (1955) ...	55	38	40	-
4% First Guar. ...	78½	60	66½	+6
4% Second Guar. ...	60	47	45½	+3
3% Deb. ...	71½	57	64	+6
4% Deb. ...	93	76	83	+5
5% Red. Deb. (1947) ...	106½	98	100	+1
4% Sinking Fund Red. Deb. ...	104½	96	98½	-
SOUTHERN				
Pref. Ord. ...	78	46½	47	+9
Def. Ord. ...	19½	7	9½	+1½
5% Pref. ...	100	76	68	+7
5% Red. Pref. (1964) ...	102½	94	90½	-4
5% Guar. Pref. ...	116½	103	102½	+7
5% Red. Guar. Pref. ...	112½	102½	100	+3
(1957)				
4% Deb. ...	103	91½	97	+7½
5% Deb. ...	118½	109½	112½	+6
4% Red. Deb. (1962-67) ...	106	98	97½	+6
4% Red. Deb. (1970-80) ...	102	96	97½	+2
FORTH BRIDGE				
4% Deb. ...	98½	81	87½	-
4% Guar. ...	95	80	82½	-
L.P.T.B.				
4½% "A" ...	115	103	106	+1
5% "A" ...	123	106½	112	+3
4½% "T.F.A." ...	105	100½	102	-
5% "B" ...	117½	102	104½	-
"C" ...	84	63½	30	+4
MERSEY				
Ord. ...	24½	17½	20½	-
4% Perp. Deb. ...	93½	88½	91	-
3% Perp. Deb. ...	77	65½	60½	-
3% Perp. Pref. ...	55	49½	54½	-
IRELAND				
BELFAST & C.D. Ord. ...	6	3	4	-
Ord. ...	6	2½	4	-
G. NORTHERN				
Ord. ...	6	2½	4	-
G. SOUTHERN				
Ord. ...	13½	8	11	-
Pref. ...	26	10	22½	-
Guar. ...	40½	22	29½	-
Deb. ...	57	45½	52½	-

Irish Traffic Returns

IRELAND	Totals for 26th Week			Totals to Date				
	1940	1939	Inc. or Dec.	1940	1939	Inc. or Dec.		
Belfast & C.D. (80 miles)	pass. 4,201	3,256	+	945	68,499	54,396	+	14,103
	goods 588	514	+	74	12,903	11,337	+	1,566
	total 4,789	3,770	+	1,019	81,402	65,733	+	15,669
Great Northern (543 miles)	pass. 14,150	14,200	-	50	276,300	249,150	+	27,150
	goods 15,300	11,650	+	3,650	311,650	264,700	+	46,950
	total 29,450	25,850	+	3,600	587,950	513,850	+	74,100
Great Southern (2,076 miles)	pass. 38,166	44,402	-	6,236	833,591	837,998	-	4,407
	goods 48,197	39,765	+	8,432	1,153,537	1,056,278	+	97,259
	total 86,363	84,167	+	2,196	1,987,128	1,894,276	+	92,852
L.M.S.R. (N.C.C.) (271 miles)	pass. 7,860	6,810	+	1,050	127,110	99,260	+	27,850
	goods 4,410	3,140	+	1,270	92,530	76,620	+	15,910
	total 12,270	9,950	+	2,320	219,640	175,880	+	43,760

Railway and Other Reports

East Kent Light Railways Company.—1 $\frac{1}{4}$ per cent. on 5 per cent. debenture (same).

Bristol Tramways & Carriage Co. Ltd.—The directors recommend an interim dividend of 4 per cent. less tax, which compares with 4 per cent. tax free.

Midland Bank Limited.—The interim dividend for the half-year ended June 30 is at the rate of 8 per cent. actual less tax, payable on July 15. The same rate of dividend was declared a year ago.

Northern Ireland Road Transport Board.—Interest at the rate of 2 $\frac{1}{2}$ per cent. a year will be paid on July 31, 1940, on the £422,422 "B" stock issued before September 30, 1937, for the two years to September 30, 1939, and on £11,408 of the same stock issued on October 21, 1937 in respect of the period from the issue date to September 30, 1939.

Missouri Pacific Railroad Company.—With an average mileage operated of 7,159 (against 7,174 in 1938), this company earned in 1939 railway operating revenues of \$83,059,361, an increase of \$2,310,287 over those earned in 1938. Total operating expenses amounted to \$65,526,280, an advance of \$903,966, and the operating ratio was brought down from 80.42 per cent. to 78.89 per cent. Net railway operating income in 1939 was \$7,195,989, an improvement of \$1,716,492, and total income was \$1,453,039 higher, at \$7,927,072. After allowing for fixed charges, etc., there was a net deficit in 1939 of \$13,093,262, compared with \$14,767,960 in 1938.

Bolivar Railway Co. Ltd.—This company works, at a rental of £9,000 per annum, the railway of Puerto Cabello & Valencia Railway Co. Ltd. Gross receipts of the two railways amounted in 1939 to £51,781, an increase of £10,371 in comparison with 1938, and in the working expenses of £47,533 there was an advance of £2,090, leaving a profit on working of £4,248, against a loss of £4,033 in 1938. Passenger receipts showed an increase of £499 and goods receipts (£44,000) an increase of £10,026. Construction of the Venezuelan Government line of about 32 miles from El Palito on the Puerto Cabello & Valencia system to Palma Sola on the Bolivar system is now expected to be completed in July, 1941. Terms of an agreement for the working of the new line by the Bolivar Company or the Puerto Cabello Company are being considered by the Government. This new line will increase the traffic of the two railways, as it will provide direct communication between Barquisimeto the terminus of the Bolivar Railway, and Puerto Cabello, Valencia, and Caracas. One of its main purposes is to transport bananas to Puerto Cabello for shipment.

Costa Rica Railway Co. Ltd.—The directors announce that the interest due on the 6 $\frac{1}{2}$ per cent. first mortgage debentures under the agreement between the company and the Northern Railway Company of Costa Rica (owned by the United Fruit Company of U.S.A.) was not paid on the due date, June 17. The Northern Railway has intimated that neither that payment, amounting to £21,287, nor the £44,740 due on June 30, will be forthcoming.

Missouri - Kansas - Texas Railroad Company.—Operating an average mileage of 3,294 this company secured in 1939 railway operating revenues of \$28,170,695, or \$312,965 more than in 1938. Total operating expenses were reduced by \$83,150 to \$22,320,830 and the operating ratio was brought down from 80.42 per cent. to 79.23 per cent. Net railway operating income amounted to \$1,284,208, an increase of \$418,471, and total income was \$453,904 higher, at \$1,643,970. After meeting all charges there was a net deficit of \$3,499,564 in 1939, which compares with a net deficit of \$3,849,166 in 1938.

Cie Francaise de Materiel de Chemin de Fer.—Trading profits for the five months ended August 31, 1939, totalled fr. 5,465,296, against fr. 5,730,235 for 1938-39. Including receipts from investments and other sources, net profits totalled fr. 4,325,684, against fr. 4,376,807, and the available balance was fr. 4,389,102, against fr. 4,469,839. Shortly before the French capitulation, the board proposed a dividend of fr. 37.50 gross, against fr. 40 gross.

Cie Gen. de Construction de Locomotives.—The extraordinary meeting held on May 14, under the chairmanship of Mr. Ernest Gouin, of which details have recently come to hand, decided to close the trading year 1939 at August 31. The ordinary meeting approved accounts for this exceptional period, showing net profits of fr. 3,051,565, after writing off fr. 13,244,831 for depreciation. The meeting voted gross dividends of fr. 6 a share and fr. 0.88 a part *beneficiaire*. The report of the directors emphasised the great activity at the Ateliers de Nantes, as well as the development of the manufacture of machine tools by Ernault-Batignolles.

Forestral Land, Timber & Railways Co. Ltd.—The issue in 1934 of £1,000,000 4 $\frac{1}{2}$ per cent. ten-year registered notes has since been reduced to £499,300. The notes are redeemable on June 1, 1944, at £101 per cent., but the company has power to redeem all or part on any interest date before June 1, 1944, at £102 per cent. on two months' notice. The directors intend to give notice to redeem on December 1, 1940, all the notes then outstanding. They propose to apply a part of the company's liquid cash resources in the immediate reduction of this short term liability and offer to acquire up to £250,000

nominal at the cash price (including interest) of £103 10s. per cent. Acceptance of the offer must reach the company's office not later than first post on July 15, 1940.

Greenwood & Batley Limited.—The directors report a net profit for the year to March 31, 1940, of £97,157, which compares with £86,967 for the previous twelve months. Tax provision is £44,892 against £19,000. The directors recommend a final ordinary dividend of 10 per cent. making 13 per cent. for the year (against 15 per cent.).

Contracts and Tenders

The Ministry of Supply states that large orders for a wide variety of war materials have been placed with the United States and the Canadian Government. The orders amount to many millions of pounds and are by far the largest ever sent to America and Canada by the Ministry. The orders for Canada have been placed direct with the Canadian Government. The United States orders will be dealt with by the British Purchasing Mission in that country.

The Import Duties (Exemptions) (No. 7) Order, 1940 (S.R. & O. No. 1140) adds to the free list machinery, including machine tools, aeroplanes and seaplanes, ball and roller bearings, ploughs, and machinery belting. The Order came into operation on July 8. One effect of the Order is to free-list the machinery for which licences could hitherto be issued under Section 10 of the Finance Act, 1932. The system of issuing duty-free licences for machinery under that section, which has been operated by the Treasury in consultation with the Machine Tool Control and the Duty-Free Section of the Import Licensing Department of the Board of Trade, will thus automatically be brought to an end. The removal of the duty on machinery does not, of course, remove the necessity of obtaining Import Licences. A complementary Order entitled the Safeguarding of Industries (Exemption) No. 11 Order, 1940 (S.R. & O. No. 1141), exempts from Key Industry Duty component parts of machinery of the kinds free-listed by the Import Duties Order mentioned above.

To make room for an expanding Government department, Crompton, Parkinson Limited has given up its offices at Bush House, London, which it has occupied for the last twelve years. Premises have been taken on the Victoria Embankment, and the company will occupy them on July 15. The address will be Electra House, Victoria Embankment, W.C.2; the telephone number will remain Temple Bar 5911. Temple Bar 1146/7 will continue to be used by the associate company, the Atlas Sprinkler Co. Ltd., which is also transferring from Bush House to Electra House.

Railway Stock Market

Owing to the failure of business in the stock and share markets to show improvement, the upward trend in security values received a moderate check this week. Nevertheless, movements on balance were in favour of holders, and the more confident market conditions were again reflected by absence of selling pressure and continued strength in British Funds. Sentiment has been assisted by the favourable impression created by recent dividend announcements of leading public companies, and moreover there are indications that the generous yields obtainable on a wide range of good class securities are now attracting increasing attention. This accounts for the further gains recorded in home railway guaranteed and preference stocks, the yields on which compare very favourably with those on the preference shares of leading industrial companies. Home railway debentures were again better in sympathy with the trend in Government securities, and in some instances gains of five points or more have been recorded on balance for the week. The market is continuing to take a more hopeful view in regard to the interim dividend announcements, due on July 26, but a cautious attitude prevails, and consequently movements in most of

the junior stocks have been small. Good demand was reported for L.M.S.R. preference stocks, and the attractive yields also drew some attention to Southern preferred.

As compared with a week ago Great Western ordinary gained 2 points to 29, and the guaranteed stock was marked up from 96½ to 100½ and the 5 per cent. preference from 61½ to 68½. Moreover, the 4 per cent. debentures improved to around par, which compares with 93 a week ago. Southern preferred showed an advance on balance from 38 to 46, but in common with most other stocks of the main-line railways, the price was inclined to move closely with the day-to-day undertone on the Stock Exchange. Southern deferred was fractionally better at 94; the 5 per cent. preference has been advanced from 61½ to 68½, while the 4 per cent. debentures were marked up from 89½ to 98. Despite the recent sharp decline in home railway debenture stocks, they are not in large supply in the market, and moderate demand has resulted in a sharp upward adjustment of quotations.

L.M.S.R. 4 per cent. senior preference was 2½ points higher at 43½, and the 1923 preference gained two points to 29½. Furthermore, the quotation for the guar-

anteed stock has been advanced from 71½ to 78, at which an attractive yield is still obtainable. L.M.S.R. ordinary lost an earlier fractional improvement, and at 12 was unchanged on balance. The 5 per cent. debentures were unchanged at 104, but the 4 per cent. debentures were moved up to 95, which compares with 87 a week ago, when attention was drawn to the generous yield. L.N.E.R. securities had a more active appearance; the first guaranteed was 5 points better at 66, and the second guaranteed 45, compared with 42½. As regards the first preference, the price was fractionally better at 27, and the second preference remained around 9½. L.N.E.R. 3 per cent. debentures, which were no higher than 58½ a week ago, have since risen to 64, and the 4 per cent. debentures from 78 to 84. A rally from 26 to 30 was recorded in London Transport "C" stock.

Very little business was again reported in foreign railway securities, but slightly better prices were made by debentures of the Central Argentine and other leading Argentine railways. Elsewhere, French railway sterling bonds were nominal. Canadian Pacific preference stock attracted some attention on the good trend in the railway's traffics.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1939-40	Week Ending	Traffic for Week			No. of Weeks	Aggregate Traffics to Date			Shares or Stock	Prices					
			Total this year	Inc. or Dec. compared with 1939	No. of Weeks		Totals		Increase or Decrease		Highest 1939	Lowest 1939	July 9, 1940	Yield % (Sec Note)		
							This Year	Last Year								
South & Central America																
Ancoagasa (Chili) & Bolivia	834	30.6.40	£ 19,540	+ 6,050	26	£ 483,440	£ 337,510	+ 150,930	Ord. Stk.	10½	4½	4½	Nil			
Argentine North Eastern	753	29.6.40	ps. 190,100	+ ps. 22,900	52	ps. 8,136,800	ps. 8,417,900	- ps. 281,100	6 p.c. Deb. Bonds	7½	5½	6½	Nil			
Bolivar ...	174	June 1940	3,930	- 720	26	24,580	24,950	- 370	Ord. Stk.	5½	4½	6*	Nil			
Brazil ...	...	...	...	...	...	...	...	...	Ord. Stk.	5½	2	2	Nil
Buenos Ayres & Pacific	2,801	22.6.40	ps. 1,124,000	- ps. 70,000	52	ps. 71,223,000	ps. 75,119,000	- ps. 3,996,000	Ord. Stk.	14	8	13½*	Nil			
Buenos Ayres Central	190	18.5.40	ps. 86,100	- ps. 24,600	47	ps. 441,700	ps. 54,686,500	+ \$24,800	Mt. Deb.	14	8	13½*	Nil			
Buenos Ayres Gt. Southern	5,082	22.6.40	ps. 1,706,000	+ ps. 181,000	52	ps. 118,091,000	ps. 118,869,000	- ps. 778,000	Ord. Stk.	13½	4½	4½	Nil			
Buenos Ayres Western	1,930	22.6.40	ps. 67,000	+ ps. 56,000	52	ps. 39,907,000	ps. 38,665,000	+ ps. 1,242,000	Ord. Stk.	10½	4	3½	Nil			
Central Argentine ...	3,700	22.6.40	ps. 1,19,800	+ ps. 572,500	52	ps. 90,500,800	ps. 102,466,050	- ps. 11,965,250	Ord. Stk.	11½	4	3½	Nil			
Do.	...	...	...	...	...	...	...	...	Ord. Stk.	4	1½	2	Nil
Cent. Uruguay of M. Video	972	22.6.40	18,403	+ 3,362	52	1,133,485	975,749	+ 157,736	Ord. Stk.	2½	1	1	Nil			
Costa Rica ...	188	Mar. 1940	22,121	- 1,348	40	158,217	200,680	- 42,463	Ord. Stk.	24½	18	17½	11½			
Dorada ...	70	May 1940	1,500	- 22	59,100	66,800	- 7,700	I Mt. Db.	10½	102	100	6				
Entre Rios ...	810	22.6.40	ps. 218,800	- ps. 72,100	52	ps. 12,411,100	ps. 13,485,300	- ps. 1,074,200	Ord. Stk.	6	3	2	Nil			
Great Western of Brazil	1,016	29.6.40	7,800	- 3,100	26	279,700	230,800	+ 48,900	Ord. Sh.	3½	1½	1½	Nil			
International of Cl. Amer.	794	May 1940	849,7519	- 818,755	22	\$2,840,951	\$2,800,927	+ \$40,024	Ist Pref. Stk.	7½d.	7½d.	1	Nil			
Interoceanic of Mexico	...	...	...	...	...	...	...	...	Ord. Stk.	7	2½	6½	Nil
La Guaira & Caracas ...	22½	June 1940	4,760	- 2,025	26	39,435	35,430	+ 4,005	Ord. Stk.	2½	1	1	Nil			
Leopoldina ...	1,918	22.6.40	22,163	+ 564,643	52	487,291	477,352	+ 10,939	Ord. Stk.	2½	1	1	Nil			
Mexican ...	483	21.5.40	\$282,300	+ \$65,500	20	\$6,192,600	\$6,431,400	+ \$238,800	Ord. Stk.	1½	1	1	Nil			
Midland of Uruguay ...	319	Apl. 1940	12,921	+ 6,073	44	106,712	89,923	+ 16,789	Ord. Stk.	2½	2	2	Nil			
Nitrate ...	386	30.6.40	7,547	+ 2,388	26	88,360	60,876	+ 27,484	Ord. Sh.	1½	1½	1½	7½			
Paraguay Central ...	274	22.6.40	\$4,994,000	+ \$1,269,000	52	\$168,968,000	\$164,502,000	+ \$4,466,000	Pr. Li. Stk.	45½	36	39	15½			
Peruvian Corporation	1,059	June 1940	70,477	+ 10,840	52	820,597	785,648	+ 34,949	Pr. Li. Stk.	1½	2	2	Nil			
Salvador ...	100	25.5.40	ps. 11,810	+ 23,340	48	ps. 228,424	ps. 298,939	+ 57,515	Pr. Li. Stk.	19½	16	15	Nil			
San Paulo ...	153½	30.6.40	42,500	+ 4,401	26	966,879	840,378	+ 126,501	Ord. Stk.	30	20	31½	7½			
Taltal ...	160	May 1940	2,540	+ 520	48	28,760	31,245	- 2,485	Ord. Sh.	6/6	8½	8½	Nil			
United of Havana ...	1,353	22.6.40	21,962	+ 4,998	52	1,267,981	1,215,210	+ 52,771	Ord. Stk.	2	1½	1½	Nil			
Uruguay Northern ...	73	Apl. 1940	1,225	+ 492	44	11,226	9,837	+ 1,389	Deb. Stk.	2	2	2	Nil			
Canada																
Canadian National ...	23,695	30.6.40	1,310,028	+ 346,702	26	22,736,310	17,536,306	+ 5,200,004	—	—	—	—	—			
Canadian Northern ...	—	—	—	—	—	—	—	—	4 p.c. Deb.	74½	60	71½	5½			
Grand Trunk ...	—	—	—	—	—	—	—	—	4 p.c. Gar. Ord. Stk.	100	76	103	3½			
Canadian Pacific ...	17,159	30.6.40	945,800	+ 302,800	26	15,077,000	12,361,600	+ 2,715,400	7½	3½	5½*	Nil	Nil			
India																
Assam Bengal ...	1,329	30.4.40	45,187	+ 6,529	4	135,060	120,437	+ 14,623	Ord. Stk.	76½	60	72½	4½			
Barsi Light ...	202	20.5.40	3,810	+ 638	7	21,030	16,267	+ 4,763	Ord. Sh.	56½	50½	42	8½			
Bengal & North Western	2,091	31.5.40	110,284	+ 15,525	9	580,088	502,024	+ 78,064	Ord. Stk.	277	229	251	6½			
Bengal Doars & Extension	161	20.5.40	3,501	+ 962	7	18,661	12,662	+ 5,999	—	91	84	215	3			
Bengal-Nagpur ...	3,269	20.5.40	247,650	+ 17,103	7	1,252,050	1,161,007	+ 91,043	—	94½	83	93	4½			
Bombay, Baroda & Cl. India	2,986	30.6.40	245,175	+ 33,075	13	2,610,900	2,347,650	+ 263,250	—	108	90	102	5½			
Madras & Southern Mahratta	2,967	20.5.40	189,225	+ 3,914	7	959,700	906,339	+ 53,361	—	104½	92	98	7½			
Rohilkund & Kumaon ...	571	31.5.40	24,297	+ 4,882	9	134,865	102,987	+ 31,878	—	280	263	255	6½			
South Indian ...	2,531½	20.5.40	121,425	+ 7,685	7	598,652	589,624	+ 9,028	—	102½	88	86½	5½			
Various																
Beira ...	204	Apl. 1940	74,663	-	30	500,580	—	—	Prf. Sh.	—	—	—	—			
Egyptian Delta ...	623	10.5.40	4,591	-	602	6	19,436	20,384	- 948	Prf. Sh.	—	—	—			
Kenya & Uganda ...	1,625	—	—	—	—	—	—	—	B. Deb.	55	39	49½	7½			
Manila ...	—	—	—	—	—	—	—	—	Inc. Deb.	91½	87½	82½	4½			
Midland of W. Australia	277	Mar. 1940	12,505	- 4,071	40	115,376	138,753	- 23,377	—	—	—	—	—			
Nigerian ...	1,900	11.5.40	33,522	- 3,457	6	250,987	199,399	+ 51,588	—	—	—	—	—			
Rhodesia ...	2,442	Apl. 1940	389,463	-	30	2,631,875	—	—	—	—	—	—	—			
South Africa ...	13,288	8.6.40	647,505	- 598	10	6,425,842	6,214,556	+ 211,286	—	—	—	—	—			
Victoria ...	4,774	Mar. 1940	884,029	+ 32,550	39	7,583,830	7,069,208	+ 514,622	—	—	—	—	—			

Note. Yields are based on the approximate current prices and are within a fraction of 1/2

* Quotation is of June 17, 1940; dealings subsequently prohibited. † Receipts are calculated @ 1s. 6d. to the rupee. ‡ 52 weeks and 1 day, 1938-39. § ex dividend

Argentine traffics are now given in pesos